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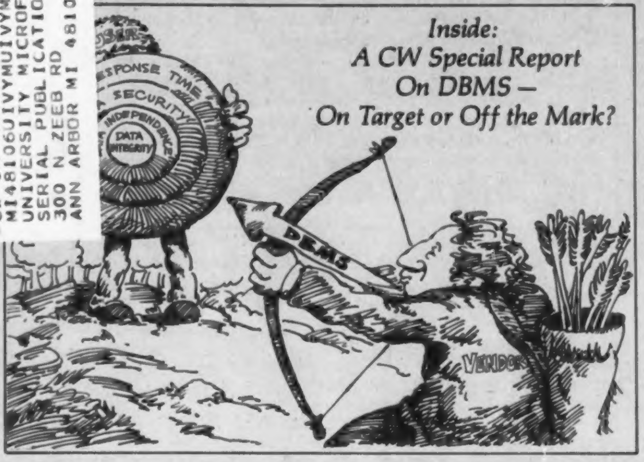

Inside:
A CW Special Report
On DBMS –
On Target or Off the Mark?

Adabas Vendor Offers Data Base Machine

By Rita Shoor
CW Staff

NEW YORK — A data base management system (DBMS) has been married to a hardware processor and the result of the union was the Data Base Machine (DBM) introduced here last week by Software AG.

The DBM combines the firm's Adabas DBMS with an IBM plug-compatible processor from Cambex Corp. It runs under VS1 and can be tied to any IBM 360, 370, 30 series, 4300 or plug-compatible mainframe in all OS and MVS environments.

Designed to function as a back-end processor, the DBM allows users to off-load data base management functions from their mainframes, thus avoiding what John Maguire, Software AG's president, referred to as "resource saturation" within the installation. "A DBMS invariably uses up a great deal of a machine's resources," Maguire explained, so a mainframe will often be loaded to capacity once the DBMS has been installed.

Third Alternative

In the past, a user that found itself in this situation was required to either upgrade its mainframe or install another machine, Maguire said. The DBM offers a third alternative costing between $300,000 and $400,000 and, in addition, provides maximum performance improvement in terms of transaction throughput of 25% over a DBMS running on a nondedicated mainframe, he claimed.

Components of the DBM include the Adabas DBMS, and Externally Supported Processor (ESP) that is fully dedicated to the data base functions and Channel-to-Channel Communications System (CTCS) to facilitate the transmission of commands, data and status information between the computer and the back-end machine.

The 2M-byte ESP's processing speed is reportedly .75 million instructions per sec (Mips). It has one byte and two block-multiplexer channels and an integrated channel-to-channel adapter.

Said to support a machine cycle time of 50 nsec, the hardware allows for field upgrading of CPU, memory and I/O channels via printed circuit board

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SBS Planning to Link Local Nets

By Brad Schultz
CW Staff

McLEAN, Va. — Satellite Business Systems (SBS) intends to give users satellite interconnections between local-area networks presently able to pass data at up to 50 million bit/sec over distances of 5,000 feet or less with a device called Hyperchannel.

Network Systems Corp. of Minneapolis markets Hyperchannel and will deliver prototypes of a "satellite link adapter" and "maintenance adapter" to SBS under a deal the companies announced jointly last week.

SBS plans to begin testing these prototypes in the third quarter of 1981, a few months after inaugurating a group of integrated private network services the firm has said will feature switched, all-digital communications among geographically dispersed sites.

A Network Systems spokesman explained that dispersed Hyperchannel installations will employ the satellite link adapter in bouncing traffic off the satellite SBS hopes will be orbiting by then. The maintenance adapter is supposed to aid detection of malfunctions along the links.

Network Systems is developing a local network architecture called Hyperbus that would operate at 1M bit/sec and provide for multidrops over distances of several thousand feet, according to Ivan Frisch, senior vice-president of Network Analysis Corp.

Hyperbus was designed for intercon-

(Continued on Page 5)

DEC Adds Scaled-Down VAX And Two 32-Bit Datasystems

By Tim Scannell
CW Staff

HUDSON, Mass. — Digital Equipment Corp. last week unveiled a scaled-down version of its VAX-11/780 minicomputer that uses bipolar gate array technology to achieve 60% of the original VAX performance at 40% of the cost.

At the same time, the firm announced 32-bit additions to its Datasystem commercial systems line and its first Winchester technology disk drive.

Introduced here at DEC's Hall of the White Mists — a name inspired by a "Dungeons and Dragons"-type computer game — the VAX-11/750 is said to have the performance of IBM's 4331 Group 2 processor, based on benchmarks DEC ran on the 32-bit processor and an IBM 4331 Group 1 in a batch environment. The recent DEC arrival is completely software-

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MIS Executives Face Changing Times

• 'Playing Ball With Users' Called Route to Survival

By Marcia Blumenthal
CW Staff

NEW YORK — Management information services (MIS) managers are going to have to come out of the locker room and play ball with users if they want to survive in the corporate organization of the 1980s.

But making the move from the safe, clubby environment of the locker room to the turbulent playing field is like constantly running into a 50-pound marshmallow, suggested Richard Dooley, vice-president of RHS & Associates. This is because user departments view MIS departments as soft and think MIS products are elusive, Dooley said during a hard-hitting session at an American Management Associations conference for MIS execu-

(Continued on Page 8)

• Careers at 'Crossroads'; Choices Seen Clear-Cut

By Tim Scannell
CW Staff

NEW YORK — Management information services (MIS) executives, barely accustomed to their new titles and still warming to the job, have come to a crossroads in their careers.

The choices are clear-cut. They can become technological experts, wrapped up in hardware and software and, for the most part, invisible to the user. They can focus on the business angle and actually influence the growth of the information processing field. Or they can become obsolete.

To add to the dilemma, there is only about a 50-50 chance at best that present MIS professionals will take the right road and not wind up being the latest dinosaurs of the information-glutted business

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• Managing Data Called Challenge of the Decade

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — A shift in management emphasis will present information processing chiefs with a major professional challenge during the next decade because, although they already know a lot about managing technology, they still have a lot to learn about managing data, an IBM consultant said here last week.

The shift will also force computing managers to reexamine and possibly even redefine their fundamental corporate roles, according to John Zachman, a systems planning consultant with IBM's Western Region.

Is an information systems executive's main responsibility to manage technology, or is it instead

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'More Than Light at End of Tunnel'

IBM Trial Stage May End by Feb. 1

By Connie Winkler
CW Staff

NEW YORK – IBM could rest its case and the Justice Department could complete its rebuttal in the U.S. vs. IBM antitrust trial by Feb. 1, the contending parties indicated last week.

"We see more than the light at the end of the tunnel, no question about it," Judge David N. Edelstein said at a meeting in his robing room Oct. 20, the first in a month.

Robert J. Staal, head of the government team, said the Justice Department would work hard to respond by Dec. 15 to IBM's latest volley of written testimony from its four economists. That written response will also include the government economists' rebuttal testimony.

"The Department of Justice wants to end this at the earliest possible time," Staal said.

Thomas D. Barr, IBM's lead counsel, then said IBM would respond to the government's economic narratives by Feb. 1. "I would hope that we might find ourselves in a position by Feb. 1 where, in one form or another, we could bring the case entirely to an end," Barr added.

It currently appears IBM does not intend to call any more witnesses.

Questions Still Hanging

All this, however, is contingent on several yet-to-be-answered questions, including whether the government will be allowed to depose IBM's economists before submitting its economic narratives and whether either side will seek in-court cross-examination of the economic experts (there has been no live court since June 7). Edelstein said he would rule soon on the deposition question.

The exchange of written narratives was agreed to in a Feb. 7 stipulation. Both sides are now arguing the other wants to change the ground rules of that stipulation.

Staal has also strongly criticized the 4,000 pages of the IBM economists' statements. He called them "rife with lawyer-like arguments of the facts."

So far the statements have only been exchanged between the parties and the court.

Barr argued the statements should be made public to demonstrate the truth. This led to several lively exchanges in the 90-minute conference, which was attended by members of the national press.

Edelstein, as he has through much of the trial, again chastised the lawyers for "personal animosity and emotional involvement that doesn't belong in the courtroom."

The judge also believes the exchange of written statements by experts will prove to be an innovation and will be used in future complex cases.

IBM's economists are Richard B. Mancke of Tuft University's Fletcher School of Law and Diplomacy, Franklin M. Fisher, professor of economics at MIT, Carl Kaysen, who has been at Harvard and Princeton Universities and is now at MIT, and James W. McKie, chairman of the Department of Economics at the University of Texas.

The government economists are Dr. Alan K. McAdams of Cornell University, Leonard Weiss from the University of Wisconsin and Lee Preston from the State University of New York at Buffalo.

'Times' Report Denied

NEW YORK – Both IBM and the Justice Department have denied a report in the *New York Times* last week that settlement talks in the U.S. vs. IBM antitrust case have been suspended.

"They haven't been suspended as far as we are concerned," Mark Sheehan, a Justice Department spokesman, said. And, according to IBM spokesman Edward Nanes, "The talks technically are still on."

Sheehan said the two sides are in telephone contact and the talks, which began Oct. 9, 1979, could be resumed at the appropriate time, although no further talks are scheduled.

The last meeting, which the government described as preliminary, was held June 7.

The *New York Times* said that neither side was willing to take responsibility for suspension of the talks and that the talks had never gotten beyond procedural questions.

This Week

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A message from John R. Bennett,
President, Applied Data Research,
to firms considering DB/DC systems.

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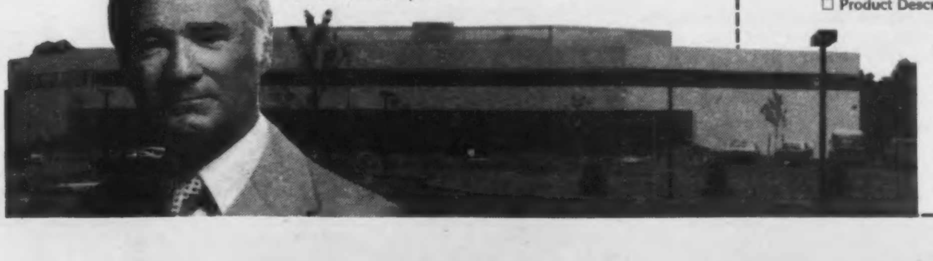

John R. Bennett, President of Applied Data Research, at ADR's new corporate headquarters in Princeton, N.J. This is one of the world's largest facilities dedicated exclusively to the design, development and marketing of systems software for IBM computers.

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Data Base Machine Debuts

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changes, according to a Software AG spokesman.

The CTCS consists of a user-machine communication module that resides in the host computer and a DBM communications module in the back-end processor joined by a high-speed, channel-to-channel link, he added.

Thus, the Adabas functions are distributed between the host mainframe and the DBM. Data base updates, finds, adds, deletes and disk management are controlled by the Adabas nucleus in the DBM. Applications programs that reside in the host computer call the DBMS through the communications interface module and are translated for transmission to the DBM through the CTCS.

Communications Transparent

Communications between the mainframe and the DBM are user-transparent, Maguire claimed, without affecting either data base activities or applications software.

Configuration possibilities allow for an unlimited number of host machines to communicate with one DBM or for an unlimited number of DBMs to communicate with one or more host mainframes. The first option allows multiple locations to access the same data base and the second provides for specialized data base applications on separate DBMs, Maguire explained.

The DBM provides the foundation for Software AG's concentration on distributed data processing (DDP) and decentralization of function to various geographical locations, he said.

Remote support for both the hardware and software will be provided by Software AG via dial-up lines. "If something goes wrong, we [Software AG] are the first line of contact," the spokesman said. Hardware failures can supposedly be isolated to the chip level and remote console capabilities are provided, he said.

Adabas requires approximately 256K bytes of resident memory in the DBM, and the CTCS software utilizes less than 20K bytes in each mainframe, according to Software AG.

When asked for an opinion as to how IBM might respond competitively to the DBM announcement, Maguire responded that "IBM is still primarily hardware-oriented" and that its motivation to compete with "this software-hardware combination" might be relatively low because of that hardware orientation.

"In large measure, it's the architecture of Adabas that helped Software AG to go this way," a spokesman continued. He said IMS, IBM's data base management system, is "ill-suited" to the DBM concept.

Available in 60 to 90 days, the DBM including all hardware, channels, communications software and a licensed copy of Adabas will cost current Software AG clients about $307,000. New customers will pay $395,000 for the same features from Software AG at Reston International Center, 11800 Sunrise Valley Drive, Reston, Va. 22091.

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Magnuson Working On IDMS Assist

By Rita Shoor
CW Staff

SAN JOSE, Calif. — There are several ways to intertwine hardware and software to increase system throughput and cut down on the overhead involved with data base management systems (DBMS).

One way is to develop a DBMS back-end processor like the one Software AG announced last week (see story on Page 1). Britton-Lee, Inc. had announced one last spring [CW, March 24], but that product is available only to OEMs.

Magnuson Computer, Inc. Systems here said last week it is going in a different direction by working on a microcode assist (MA) feature for Magnuson customers who use Cullinane Corp.'s Integrated Data Base Management System (IDMS).

Described by a spokesman as "being under development and on schedule," the IDMS/MA feature will supposedly add several instructions to the IBM 370 instruction set, replacing frequently used IDMS routines.

The IDMS/MA will be the first in a series of microcode assist packages planned by Magnuson, Kevin Anderson, Magnuson's vice-president of software, informed attendees at a recent IDMS users conference in Las Vegas.

While Cullinane techicians did "isolate the parts of the system [IDMS] that were most used" and, therefore, candidates for conversion to microcode, the microcode will actually be developed and marketed by Magnuson, according to spokesmen for both firms.

Based upon the assumption that IDMS/MA development will continue to be "on schedule," the feature will be available in the first quarter of 1981 and is expected to carry a unit price of $5,000.

Challenge of '80s Described

(Continued from Page 1)

to manage data as a corporate resource?

Efforts to resolve that thorny issue are likely to preoccupy information processing professionals for much of the coming decade, Zachman said at an International Data Corp. executive conference on "Improving Information Processing Profitability and Productivity."

Six Stages

Zachman likened the typical systems evolution to a learning curve consisting of six stages: initiation, expansion, control, integration, data administration and data resource. Each phase lasts approximately four to seven years.

The first two stages are characterized by systems installation, initial success, user enthusiasm and rapid applications deployment. By the time a system reaches the third stage in its evolution, top management has become so alarmed at the explosive growth in its computing expenditures that it has clamped a moratorium on further applications development.

The imposition of a moratorium places a user's information systems department in a classic bind between shrinking development resources and galloping user demand.

To ease the budget pinch, the computing department typically acquires a data base management system in the hopes of consolidating its many applications and possibly freeing some of its otherwise committed resources to new project development, Zachman said.

Somewhere at about this point in stage 3 of its systems evolution, a user's management emphasis begins to undergo a subtle but highly significant shift. Prior to the change, a company's systems department typically stressed the management of hardware and technology, but afterwards, the focus of its professional attention turns instead to management of data.

The transition from managing technology to managing data marks an evolutionary turning point and lies roughly midway in a user's journey toward full systems maturity, when a company begins managing its data like any other major corporate resource.

By the time it reaches the final phase of its systems evolution, a company's computing department has ceased to exist as a DP organization in the traditional sense of the term. Most of the classic DP services have long since been distributed and placed in the hands of the nontechnical people who need them.

The only functions that remain directly under the computing shop's control are responsibility for maintaining hardware and responsibilty for managing data, Zachman said. At this point in its evolution, the systems organization is doing roughly the same thing for a company's data that a corporate finance department does for the firm's cash.

Just as the finance department designs a companywide chart of accounts and sets policies for managing money, so does the information processing organization develop a uniform systems architecture and create policies for controlling data, Zachman explained.

Because of the computing field's comparative youth, no user organization has yet had an opportunity to reach the final phase of its systems evolution. In fact, even today's most advanced users — a group that includes about 50% of the Fortune 500 — have progressed only as far as Stages 3 or 4, Zachman said.

The cost, risk and difficulty involved in scaling the upper reaches of the learning curve might convince some users that they would probably be better off not attempting the climb at all, the consultant said.

For the time being, users are unlikely to suffer any serious consequences if their systems evolution temporarily stalls at the third or fourth stage of the six stages. But sooner or later, external factors such as growing resource shortages will force reluctant users to abandon the status quo and resume their slow progress up the systems learning curve, Zachman said.

Univac Climbs on X.21/X.25, ISO Bandwagon

By Brad Schultz
CW Staff

BLUE BELL, Pa. — Univac last week joined Honeywell, Inc. in declaring support for the X.21 and X.25 communications interface standards and the International Standards Organization's (ISO) open systems interconnection reference model.

Univac announced it has completed pilot testing of certain X.21/X.25-compatible products using Canada's Datapac, a public packet-switched network. The Sperry Corp. division will now commence a phased implementation of both hardware and software X.21/X.25 products over the next two years, a spokesman stated.

Besides giving customers access to North American packet-switched networks such as Datapac and those offered by GTE Telenet Communications Corp. and Tymnet, Inc., Univac plans to offer interfaces to public packet nets in Europe and Japan, where IBM already offers X.21 and X.25 compatibility.

The Consultative Committee for International Telephone and Telegraph's (CCITT) X.21 and X.25 standards address the three lowest levels of the ISO's open systems interconnection model and are not presently supported in the U.S. by IBM. That vendor's Systems Network Architecture (SNA) imposes more centralized control than the ISO model and has been criticized as "locking" network users into sole-source dependence on IBM — even to the exclusion of plug-compatible vendors [CW, Oct. 6].

Meanwhile, Honeywell has called its new X.21/X.25-compatible Distributed Systems Architecture (DSA) the "blueprint" for Honeywell DP products in the 1980s [CW, Oct. 13]. And a top Univac executive has remarked that "support of these [packet-switched network] standards will be part of our Distributed Communications Architecture (DCA), which provides our customers with the guidelines and capabilities to employ communications networks that best fit their organizational needs."

The ISO model allows users to interconnect different network architectures serving multivendor networks. This approach defines seven functional layers of standardization ranging from the "nuts-and-bolts" physical control layer of connections between devices to the application layer, which would concern end users as the context for program execution and data base access.

While application (layer seven) would engage the end user's attention, the lowest levels — physical control, data link, network and transport (layers one through four) — would typically be user transparent, and the next higher levels — session (layer five) and presentation (layer six) might only concern systems planners and network managers in the user organization.

While the ISO continues to develop layers four through seven of its open systems model, only Univac's DCA among architectures announced to date by major vendors specifically includes the model's first layer in its definition, one analyst has concluded. At the second layer, where data is passed across network links, only DCA and Burroughs Corp.'s architecture appear to fully support the High-Level Data Link Control (HDLC) protocol, he said.

The Synchronous Data Link Control protocol within SNA forms a functional subset of HDLC, the analyst explained.

Another analyst has remarked that the ISO model, in contrast to SNA, permits the network manager to better remove problems of routing data from one end of a network to another from local problems like managing multiple paths between particular nodes.

SBS Link Ahead For Local Nets

(Continued from Page 1)

nection of terminals or computers of different vendors through devices called bus interface units, Frisch told *Computerworld*. The Hyperbus access protocol is quite different, he said, from those featured by two other local net schemes, Mitre Corp.'s Mitrenet and Ethernet, the joint offering of Xerox Corp., Digital Equipment Corp. and Intel Corp.

Until recently, the Institute of Electrical and Electronics Engineers' (IEEE) Data Link Media Access Committee (DLMAC) appeared ready to adopt as the industry standard for local nets something very similar to Ethernet, whose specifications were recently made public [CW, Oct. 6]. But the access protocol and other issues, such as whether to integrate video with data communications (Ethernet excludes video), suddenly appear far from resolution by the committee, Frisch noted.

The DLMAC recently voted to delay submitting recommendations on a local net standard pending further investigation of these issues. Delay probably hurts Xerox more than the other backers of Ethernet, Frisch surmised, because Xerox has moved farther in preparing an Ethernet-based product line on the assumption that Ethernet would essentially be the standard.

For "proprietary reasons," SBS and Network Systems declined to say how much development of the service will cost. The latter company's address is 6820 Shingle Creek Parkway, Brooklyn Center, Minn. 55430.

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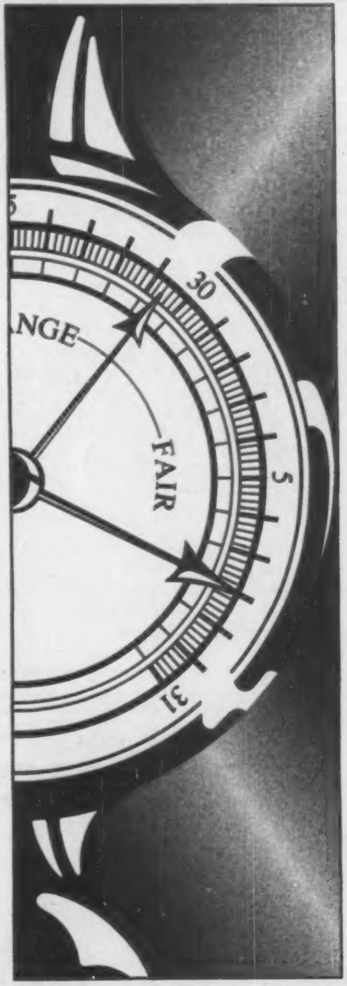

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DEC Unveils Scaled-Down VAX

(Continued from Page 1)

compatible with the VAX-11/780, introduced by DEC a little more than three years ago.

The VAX-11/750 incorporates low-power gate array circuitry rather than the TTL and integrated circuits used in the 780 machine. The 750 is reportedly the first 32-bit minicomputer to take advantage of existing large-scale integration (LSI) gate array designs.

The gate array chips in the 750 — 55 in each processor and 90 in each full system — are said to each perform the function of 25 integrated circuit boards. However, the arrays use only half the power of the printed circuits and reportedly have four times the reliability.

Using gate arrays also reduces the number of printed circuit boards from 12 in the 780 to only five in the 750, according to Don McInnis, the computer's product manager.

While the 750 shares many of the same features of the 780 — such as the same 32-bit word length, 4.3G-byte virtual address space and 2G-byte maximum program size — the systems do have some distinct differences. For instance, the 750 has a 4K-byte integral bipolar cache memory while the 780 has an 8K-byte cache.

The 750 also boasts a 5M byte/sec I/O bandwidth as opposed to its older brother's 13.3M byte/sec bandwidth, and the newest VAX has an optional 80-bit word size, 1K-byte random-access user control store while the 780 has a 99-bit word size, McInnis said.

Distributed Target

While DEC forecast that the VAX-11/750, like its predecessor, will have its largest impact on the scientific processing arena, the firm also hopes the machine will find a solid niche in the commercial area, "where smaller CPU costs and hardware are called for," McInnis observed. In particular, the minicomputer maker is aiming the 750 — which, in laboratory conditions, has "comfortably" handled up to 32 concurrent users — at the distributed processing marketplace.

However, a DEC representative at last week's announcement declined to define what the company meant by "distributed processing" except to say that such an ability would bring "more power of the computer out to where the job is being performed."

One drawback, however, is that neither VAX processor has a data base management system (DBMS).

The VAX-11/750 is geared to take advantage of the firm's Decnet networking facility and IBM's 2780 protocol. Also, as previously announced, DEC has committed itself to adhere to IBM's Systems Network Architecture and the X.25 protocol in planning for future systems and integrations.

Winchester Drive

At the same time it made its VAX-11/750 introduction, DEC also unwrapped a 124M-byte Winchester-technology disk drive designed for the firm's 32-bit computers. The RM80 has scaled read/write heads, platters and spindle to eliminate outside contamination.

The disk has an average seek time of 25 msec and an average access time of 33 msec. The unit's data transfer rate is 1.2M byte/sec.

The RM80 is available with single-port or optional dual-port access. In addition, up to eight RM80s or other DEC disk drives can operate on a single VAX controller.

Datasystem 700

Caught up in VAX fever, the minicomputer manufacturer also unveiled 32-bit versions of its Datasystem 700 series commercial computer line. The D750 and D780 join the Datasystem 300 and 500 series and are capable of up to four times the performance of the previous systems, a spokesman said.

The D700 series boasts the 4.2G-byte virtual address space and 2G-byte user program space of the VAX architecture as well as the information management capabilities common to the 300 and 500 series machines. A standard D780 configuration consists of 1M byte of memory, the RM80 disk drive, a high-speed tape drive, VAX-11 Basic, VAX-11 FMS and Datatrieve.

All of the recently debuted systems utilize DEC's 32-bit Fortran, Cobol, Basic, PL/I, Pascal, Coral 66, Bliss-32 and PDP-11 programming languages and utilities.

The entry-level 11/750 package with two RK07 28M-byte disk drives and VAX/VMS operating system costs $89,900. A larger system with 1M byte of memory, the operating system, a TS11 1,600 bit/in. tape drive and the RM80 disk drive costs $120,000. An OEM version is available for $47,000.

Initial deliveries of the 11/750 begin next month. However, volume shipments of the entry-level machine will not start until April and not begin until two months later for the system with the RM80 drive.

Prices for the Datasystem D750 with 512K bytes of memory, two 28M-byte disk drives, VAX-11 Basic, VAX-11 FMS, Datatrieve and the firm's customer support package start at about $100,000. The larger D780 system with the 124M-byte Winchester disk is priced from $250,000. Deliveries of both systems will commence in April and January respectively.

Finally, the RM80 disk drive and controller costs $29,900 and add-on units cost $19,900. Deliveries of the unit will start at the beginning of next year.

CW Photo by T. Scannell

Don McInnis, DEC's 11/750 product manager, uses a clear-plastic paneled processor to show off the bare VAX.

Why DEC Went This Array

HUDSON, Mass. — The bipolar gate array chip was not the only technology considered by Digital Equipment Corp. before it began building the VAX-11/750 processor introduced last week. Researchers at the firm's manufacturing plant here investigated most other popular circuitry before deciding on the gate array design.

MOS technology was eliminated because it did not meet performance goals set by DEC in the initial VAX-11/750 planning phase. TTL circuits were scratched because they would have added too many boards to the processor and would negate the whole idea of a smaller machine.

The gate arrays were finally chosen because they occupy only 20% of the space on a printed circuit board, cost less than half as much as the other technologies and are said to be four times as reliable. As a result, the 750's cabinet size matches that of DEC's PDP-11/44 and PDP-11/23 systems.

The custom-designed gate arrays are one of the first products to come out of DEC's intergrated circuit manufacturing facility here in Hudson, Mass. However, because of anticipated demands for the new VAX system, DEC has contracted with two unidentified independent chip manufacturers to produce the arrays.

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IBM Updates Displaywriter With Math Support, Storage

FRANKLIN LAKES, N.J. — IBM has enhanced its four-month-old Displaywriter text processing system so that the system can perform basic mathematical calculations and expanded text processing operations and also provide increased "electronic dictionary" functions and storage capacity.

The math, text processing and expanded spelling capabilities are made possible by two new licensed programs on prerecorded diskettes called Textpack 3 and Languagepack. The increased storage is provided by two new diskette units that can store more than three times as much information as previously available disks — up to about two million characters of information, IBM said.

Textpack 3 enables a typist to change in one operation a word or term used throughout a document, to automatically merge standard and variable information and to assemble documents from previously stored information. It also provides support to enable an operator to verify addition, subtraction, multiplication and division and automatically rearrange stored statistical data, IBM said.

Languagepack features a verification aid that checks the spelling of documents typed in French, French Canadian, Spanish, German, Italian and Dutch, as well as forms of English commonly used in the U.S. and the UK.

Increased storage is provided by a dual-sided, double-density diskette, the Diskette 2D, which can be used with new single and double diskette units that can be attached to the Displaywriter by the user.

The monthly fee for Textpack 3 is $25; deliveries will begin next September. Languagepack costs $15/mo and deliveries will begin in May.

The single and dual diskette units are, respectively, the IBM 6360 Diskette Unit Model 20, which costs $1,700, and the Model 22, which costs $3,300. Deliveries are scheduled to begin in June.

IBM's Office Products Division is at 400 Parson's Pond Drive, Franklin Lakes, N.J. 07417.

52% Attracted by Price/Performance

Most VAX-11/780 Users Pleased, Survey Finds

By Marcia Blumenthal
CW Staff

NEW YORK — Sixty-seven percent of the users of Digital Equipment Corp.'s VAX-11/780 would unconditionally recommend the system to others, a recent survey found.

Today, about 80% of VAX systems are used primarily for scientific, engineering or educational applications, but some 50% of new VAX installations will be for commercial purposes, predicted MSRA, Inc., the firm here that performed the survey.

That prediction appears to be on the right track. Last week, DEC introduced its VAX-11/750, which is expected to be aimed at commercial users. The 780 is too big for commercial applications, one DEC executive noted at the firm's press conference announcing the addition to the VAX family.

Of the 39 surveyed VAX-11/780 users representing 56 systems, 52% chose the VAX because of price/-performance, while another 28% rated compatibility with other DEC system and/or software and the virtual memory operating system as selection determinants. The virtual memory operating system was judged by 41% of the users surveyed as the most attractive feature of the system.

In assessing the advantages of a 32-bit system, 44% of the users cited address space as the principal advantage and 31% mentioned speed, the MSRA survey noted.

Although users had some complaints about the system, MSRA concluded the beefs were more directed at DEC as a vendor than at the system.

Availability 'Fair to Poor'

Sixty-seven percent of the respondents rated DEC fair to poor on availability of hardware and/or software. While users were highly satisfied with the VAX's operating system and compilers, 72% called the applications software "poor."

About one-third of these users said they would like applications packages for business, computer report instruction packages, a Cobol manufacturing system package and a graphics package. Ninety percent of the users surveyed now do nearly all of their own applications packages.

Those surveyed would also like to see DEC improve software compatibility between the VAX and other DEC systems, better networking software and a faster Fortran compiler.

The reason most frequently cited (56%) for installing a VAX was for expansion or new applications. When the replacement of other equipment was involved, the VAX displaced Control Data Corp. hardware in 13% of the cases and IBM's equipment and DEC's own equipment in 8% of the cases.

Other Systems Evaluated

Although 74% of the users installing VAX systems were already DEC users prior to selecting the VAX, 46% of the respondents said they evaluated Prime Computer, Inc.'s systems. Moreover, 26% examined IBM's offerings and 23% considered Systems Engineering Laboratories, Inc.'s (SEL) system or hardware from Hewlett-Packard Co.

While ultimately rejecting Prime, many users surveyed noted the high-end Prime 750 was not available at the time. However, 50% of the respondents who mentioned Prime as an option concluded that the VAX outperformed the Prime system overall.

IBM systems evaluated were the 4300, System/34 and 370/138. One reason users gave for rejecting IBM's systems was their batch-oriented architecture.

In classifying users, the MSRA survey found that 36% of the VAX users were at universities, 23% in corporate research and development departments and 13% at OEM sites.

Contrary to the growing preference among users for leasing equipment, 77% of the VAX users surveyed purchased their systems.

This trend toward purchase did not seem to be related to the size of the user's annual DP budget, which varied widely. Some 51% of the users had budgets in the less than $250,000 to $1 million annual range, while 31% had an annual DP budget of between $1 million and $10 million. The average breakdown of expenditures was 44% for hardware, 29% for software and 27% for maintenance.

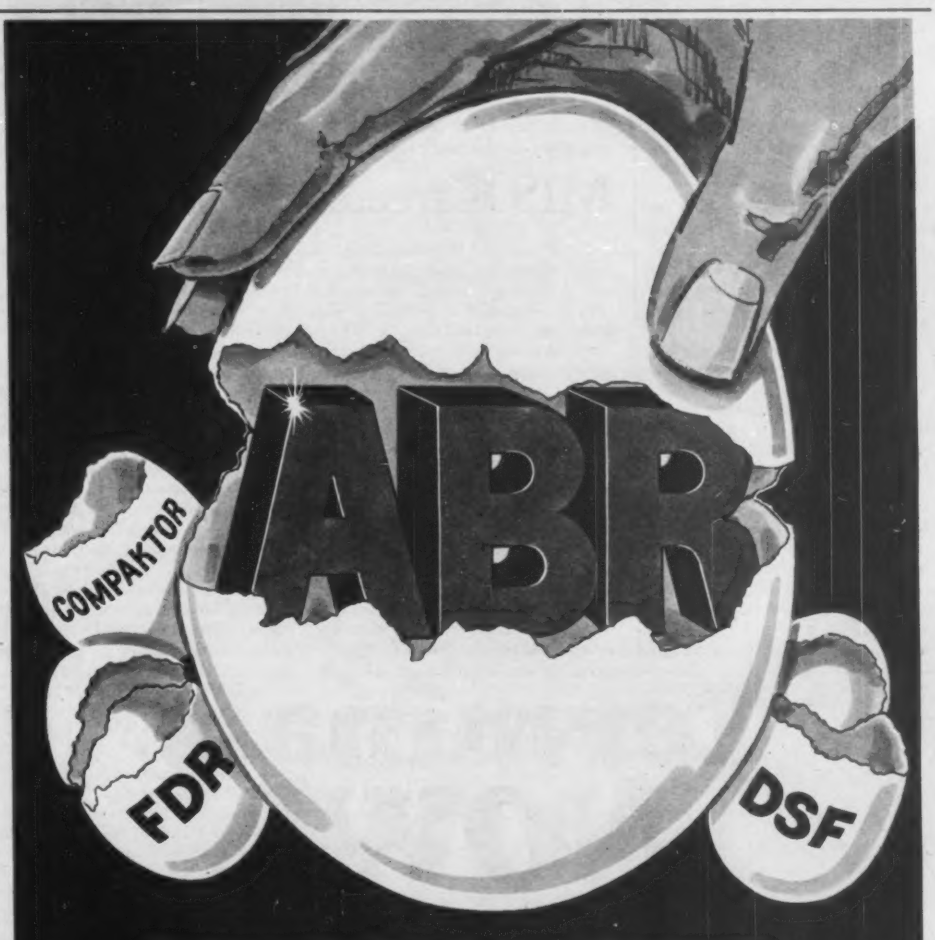
Major Competition

At the present time, DEC's major competition in the 32-bit market comes from Prime, SEL and Perkin-Elmer's Computer Systems Division. However, as 32-bit systems become more oriented to the commercial sector, VAX will compete more with IBM systems, as well as HP's anticipated 32-bit mini offering, MSRA predicted.

Currently, 1,600 VAX-11/780s are installed, MSRA said.

Many users noted the VAX system would be appropriate for commercial applications because of its price/-performance relative to mainframes, its Cobol compiler, speed, instruction set and DEC's support.

The 127-page survey is available for $600 from MSRA at 115 Broadway, New York, N.Y. 10006.



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Managers Advised to 'Play Ball' With Users

(Continued from Page 1)

tives here recently.

The corporate executive sees total expenditures for MIS going up and considers this a con game because the benefit of information processing to the company's bottom line is not evident.

"We haven't done a good job of making it clear how the benefit of what we do gets to the bottom line. Instead, we look like overhead or a bureaucracy to management," he contended.

Moreover, MIS departments have standards they don't want to alter to support what users need, which in turn makes users think systems professionals are throwing obstacles in their way, Dooley observed.

"Most of the stuff run in the MIS department isn't touched by users. So the secret is pushing more IP [information processing] power out to the user," Dooley asserted.

This isn't easy for most IP professionals, he admitted, but urged his audience to remember "your company is not in the data processing business." And, although it may be hard to swallow, MIS is nevertheless a staff function, not a line function in the organization. MIS managers are going to have to stop giving directives to users, he warned.

The resistance of users to systems professionals is already seen today in many organizations as user departments bypass the central DP operation for purchasing. Vendors like the telephone companies and micro and mini vendors are selling directly to user departments. Even the hobby shops are targeting managers of small units within the company that do not want to deal with the central DP unit, Dooley suggested.

"This makes it look like our function is simple," Dooley contended.

Equal Responsibility

While he stressed the need for IP professionals to improve communications and service with user departments, Dooley placed equal responsibility on user groups within the organization.

Users of MIS services must set priorities for their own departments and assess the benefits of the applications they want, including cost justifications, Dooley maintained. "Up until now the user wasn't on the hook for benefits."

Moreover, user departments should be in on some of the technical reviews of applications and should take responsibility for implementing and promoting them within their departments. It has been all too easy to blame the IP department when things go wrong, Dooley observed.

And, things will go wrong.

Expect problems. "The systems business is a flow of problems asking for solutions," he pointed out.

Although Dooley conceded that poor communication between systems personnel and user departments won't change overnight, he suggested some steps toward removing friction between the two departments.

MIS departments must have a link to users. "Identify an IP liaison in each division," Dooley suggested, adding that an M.B.A.-generalist type would be the ideal link.

Instead of killing the user departments with data, MIS staffs should try to understand the feelings of people in these departments, he suggested. "If you want to optimize communications, you must increase trust."

MIS Adapting, Managers Say

NEW YORK – Are management information services (MIS) departments changing with the times? "Yes" is the answer based on spot interviews with some of the 50 MIS managers attending an American Management Associations conference here recently.

Wallace Smith, director of DP for Home Box Office, said his company is so new that the information processing function has not had time to become rigid. The company is getting user departments involved, especially by using nonprocedural languages.

Some analysts complain about losing control, Smith noted, but they must change.

At New Jersey Bell, the total MIS function is being reorganized based on a recommendation of the parent company, AT&T.

User departments will become more involved with application design specifications, conversion and implementation. Using matrix management, one large system has already been installed, the company's MIS director reported.

Robert Beatty, MIS director at Cincinnati Electronics Corp., said his department's liaison with the manufacturing, finance and purchasing departments have been reorganized. One staff person from each of these functions now works with the MIS staff.

MIS Careers Considered at Crossroads

(Continued from Page 1)

world, according to A. Jackson Forster, director of corporate systems and data processing for the New Jersey-based Ingersoll-Rand Co.

Speaking last week at an information technology seminar held by the American Management Associations (AMA) at its headquarters here, Forster offered a glimpse of the MIS executive's changing role in business and laid out some basic groundrules for corporate survival. He was aided in his presentation by Samuel B. Harvey, senior vice-president of RHS & Associates, Inc., also in New Jersey, who detailed some expected technological developments.

Attendees at the two-and-a-half day conference included MIS professionals from such firms as Eastman Kodak Co., Univac and the Bank of America.

While Harvey described computer hardware as almost a giveaway, dropping in price an average of 10% a year, he stressed that communications, particularly fiber optics, will be the moving force in the information processing arena. Likewise, such software developments as independent data base management systems – set apart from applications programs – and nonprocedural programming languages will serve to give the user more control over a local system.

It is important, then, that MIS professionals not be tied too tightly to the technological end of an information system, Harvey said – particularly since the technologies, protocols and multiple "standards" are so volatile.

Managers locked into the technology mold are controlled by the user and are slaves to the equipment. Eventually, these managers will be relegated to maintaining old applications, Forster pointed out, continuing with Harvey's theme, the MIS future.

On the other hand, MIS executives who travel the right path and focus on business will have a chance to work with users toward information resource goals and coordinate the technology specialists. They will also be better able to justify meeting MIS costs, which are rising 15% to 18% per year, Forster noted.

By adapting to the business mold, MIS executives could regain lost territory in the business field, "where we have tried and failed for 10 years," Harvey stated.

Ten-Point Plan

Wrapping up his MIS pep talk and warning, Harvey offered a 10-point strategy for surviving on the often-stormy information management seas:

1. Understand the changing situation.
2. Be aware of technology trends.
3. Understand the controlling factor in an organization.
4. Recognize this factor's significance to MIS activities.
5. Obtain strategic direction and guidance from top management, lest you be shot down early in the game.
6. Develop a strategic systems plan involving a business slant, with user control and all the information capabilities at your disposal.
7. Utilize the newest application development tools, such as nonprocedural programming languages, to impact systems development work.
8. Organize the department to meet any new requirements. This involves coordinating the business specialists, the technology and the planning departments.
9. Develop an effective relationship with the business sector.
10. When the capabilities exist and are proven, push into the business mainstream with a passion, but be constantly aware of new and developing technology.

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Memo Surfaces in Australia; Reportedly Tells IBM Reps How to Discredit Users

By Brad Schultz
CW Staff

CANBERRA, Australia — A document that reportedly tells IBM salespeople how to discredit users who recommend against buying IBM equipment has surfaced amid charges that IBM got preferential treatment from Australia's Federal Department of Housing and Construction (DHC) in winning a computer contract worth more than $40 million.

The charges were leveled not long before Australia's recent national elections by Tom Uren, the DHC shadow minister and a high-ranking member of the Australian Labor Party. Uren told fellow members of his country's House of Representatives that IBM got the DHC deal as a "sop" because the vendor failed to land a $23.4 million computer contract from the Australian Bureau of Statistics last November.

The award went to Fujitsu Ltd.'s subsidiary, Facom Australia Ltd., instead and was considered a major blow to IBM's prestige in Australia.

The DHC minister, Raymond Groom of the Liberal party, has denied Uren's charges that he showed favoritism toward IBM. If the Liberals had not won the recent elections, Uren would theoretically have taken Groom's job.

Uren has presented Parliament with a document he claims is a summary of IBM's marketing strategy for handling DP users whose procurement staffs decide to buy from a competitive vendor. Without explaining how he obtained the document, Uren said it was sent to IBM Australia by IBM Canada.

IBM Counters

However, IBM Australia, managing director, A.G. Moyes, countered that the document appears to be advice to buyers of capital equipment on how to defend their selection decision rather than a marketing strategy. "We have been unable to identify the source of the material," Moyes claimed, "But we are confident it was not produced by IBM."

The document sets forth tactics a vendor sales representative might use to discredit in the eyes of user management a person or staff that recommends against buying from the rep's company. But IBM is not mentioned by name. "All marketing personnel must recognize that there is never a technical or cost reason for the selection of competitive equipment," the document began. "The reason for the loss of any sale is a marketing error.

"The intent of this strategy is to expose marketing errors and correct them before the prospect makes a potentially damaging mistake," the document continued.

"An important part of this strategy is to occupy management's time, to worry the [procurement] recommender and evoke displays of emotion from him, thereby giving proof positive of his loss of objectivity. The recommender's management is cast in the role of the older, wiser head who must now bring the errant child back into line."

Uren called the document "a remarkably frank if crude statement of corporate manipulation of government bureaucracies." The Labour shadow minister indicated that IBM Australia applied the tactics outlined in the document to DHC administrators in the course of securing the $40 million deal.

Moyes has denied Uren's claim that IBM Australia plans to close its office in Canberra, Australia's national capital, because of a poor sales record there. IBM holds the largest market of total computer sales to Australia — a share estimated to be roughly 40% — but the vendor presently holds only a 3.6% share of sales to the nation's federal government, according to a recent survey.

The thrust of Uren's allegations about IBM in Canberra was that termination of an office here would make the Australian federal government's IBM installations less important, in terms of priority for service and support, to IBM. This would undermine the quality of DP at those sites, the shadow minister indicated.

Service Provides System Details

CHERRY HILL, N.J. — A DP information service that is updated monthly for managers of small, medium and large DP systems has been announced by Data Decisions, Inc.

"Computer System" provides detailed reports, specifications and prices on all currently marketed hardware, software, office automation and data communications products from major vendors. The reports are contained in two loose-leaf volumes and emphasize current information, ease of use and wide scope of product coverage.

Each report includes a product overview, an analysis of strengths and weaknesses, a hierarchical description of features and prices, user reactions, vendor profiles, product comparisons and alternatives. Charts and graphs are designed to help subscribers compare typical purchase/lease prices for complete systems, hardware or software.

Subscribers to the service also receive:

- Twelve monthly supplements of recently announced features and options, updated prices and analyses of technological trends.
- Twelve monthly newsletters covering late-breaking news, corporate mergers, acquisitions and reorganizations and a calendar of trade shows and seminars.
- A "dedicated hot line" telephone service offering unlimited consulting support for those with specific questions about products or applications.

"Computer System" is the first of a line of information services planned for release by Data Decisions, an affiliate of Ziff-Davis Publishing Co. Available on a charter subscription basis, the package costs $590 through the end of 1980 or $635 thereafter.

For more information, contact Data Decisions, Inc., Suite 312, 20 Brace Road, Cherry Hill, N.J. 08034.

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	Hartford	15,300	18,700	21,500	25,500	21,500	26,700	31,100	24,300	26,500	28,300
	New Hampshire	14,700	17,400	18,500	22,000	19,600	22,000	26,900	21,000	23,500	26,700
MIDDLE ATLANTIC	New Jersey (Central & Northern)	15,000	18,500	21,800	25,800	21,500	25,200	31,400	25,400	27,800	31,500
	New York City	16,700	20,300	23,500	29,500	22,800	27,000	33,800	25,500	30,300	37,100
	Philadelphia	15,000	17,700	21,100	23,800	20,500	23,900	29,000	23,400	26,300	29,800
EAST NORTH CENTRAL	Chicago	16,400	18,300	21,200	24,800	21,100	24,600	29,600	24,400	27,500	31,500
	Cleveland/-Columbus	14,200	17,100	20,700	23,400	20,900	25,300	30,400	23,900	26,900	30,500
	Columbus										
	Detroit	15,300	18,500	21,500	25,000	20,900	24,900	26,400	24,600	28,500	31,700
WEST NORTH CENTRAL	Kansas City	15,500	18,600	21,400	24,600	20,600	24,800	29,200	24,100	27,200	30,500
	Minneapolis/-St. Paul	15,400	18,500	21,300	24,400	20,200	24,100	29,000	24,100	26,900	30,300
	St. Louis	15,700	18,600	22,600	24,800	20,300	25,600	33,500	25,600	29,200	33,700
SOUTH ATLANTIC	Atlanta	14,900	17,400	20,300	24,200	20,100	24,200	29,100	24,600	27,800	31,400
	Miami	14,000	17,400	19,500	24,200	20,200	23,700	28,500	23,500	25,800	30,500
	Washington, D.C.	16,500	18,800	22,100	25,300	23,400	28,600	34,200	26,900	29,500	33,200
SOUTH CENTRAL	Dallas/-Ft. Worth	14,900	17,900	20,400	23,800	19,800	23,400	28,500	22,700	26,500	29,600
	Houston	15,400	18,500	21,200	25,100	20,800	25,100	29,800	24,500	28,000	30,800
	New Orleans/-Baton Rouge	13,800	16,100	18,900	21,900	19,100	22,400	26,700	22,100	25,100	27,800
MOUNTAIN	Denver	14,500	17,100	20,600	24,100	20,400	23,700	28,500	22,600	26,000	29,900
	Phoenix	14,700	17,200	19,900	23,300	19,400	22,300	28,500	22,600	26,000	29,900
PACIFIC	Los Angeles	16,600	19,500	22,300	26,700	22,000	25,800	31,100	25,400	28,600	33,200
	San Francisco Bay Area	15,700	19,300	22,700	26,200	21,500	25,100	30,200	24,700	27,900	33,600
	Seattle	15,800	18,200	21,500	23,800	20,900	23,500	27,900	23,700	26,500	29,200

By Ann Dooley
CW Staff

CHICAGO — They do the same work, but computer personnel in some parts of the country are paid as much as $20,000 more for the same job than their counterparts elsewhere.

That's the finding of a salary survey done by Source EDP, Inc., a professional recruitment firm, that covers the period from June 1979 to June 1980.

Professionals in the larger metropolitan areas of the East, such as New York, Boston and Washington, D.C., earned the largest salaries. Rural areas like New Hampshire or those in the South such as the New Orleans and Baton Rouge area were found to pay some of the lowest DP salaries in the country.

> *Professionals in the larger metropolitan areas of the East earn the largest salaries, according to a survey that covers the period from June 1979 to June 1980. That doesn't mean, however, that their dollars buy more.*

In upper management and senior-level staff positions, New York City was the highest paying. The median salary for an informations systems director at a large installation in New York was $63,000, for instance, while those in the same job in New Orleans/-Baton Rouge earned $42,100 last year — a difference of more than $20,000.

However, the salary figures by themselves can be misleading. Most of the wages corresponded to the cost of living index in each particular location, so that while the earnings may be higher, the dollar amounts earned might not necessarily buy as much in New York or Boston as they would elsewhere, Source EDP explained.

What's more, the salary figures found by Source EDP's "1980 Local Metropolitan Salary Survey" are not necessarily representative of the computer population as a whole and represent only the more mobile part of the DP population that contacted one of the recruitment firm's offices in the last year.

Base of 30,000

The survey, based on an analysis of 30,000 computer professionals and 14,000 client organizations, showed that managers' salaries increased according to the size of the installation and nonmanagement salaries were tied to the length of an employee's professional experience.

Source EDP defined a small organiza-

Mobile Part of Population Sampled •

According to Region, Survey of U.S. Finds

REGION	POSITION	SYSTEMS AND PROGRAMMING MANAGERS			OPERATIONS MANAGERS			INFORMATION SYSTEMS DIRECTORS		
		Size of Firm: Small	Medium	Large	Size of Firm: Small	Medium	Large	Size of Firm: Small	Medium	Large
	North American Median	$29,400	$34,200	$38,500	$23,700	$27,000	$32,100	$32,200	$39,000	$46,900
NEW ENGLAND	**Boston**	32,000	36,400	40,500	24,000	28,500	34,900	33,200	41,800	52,100
	Hartford	28,500	34,500	38,200	23,200	26,200	34,100	28,600	37,600	46,300
	New Hampshire	24,000	29,800	33,500	18,200	22,000	27,100	27,000	31,200	44,300
MIDDLE ATLANTIC	**New Jersey (Central & Northern)**	30,200	34,500	39,700	24,800	27,400	33,100	34,300	43,500	51,500
	New York City	32,900	40,000	45,500	27,900	32,600	40,800	40,500	50,500	63,000
	Philadelphia	29,000	32,300	36,600	22,600	26,700	32,400	32,300	40,100	51,300
EAST NORTH CENTRAL	**Chicago**	29,300	34,600	39,000	23,500	28,100	33,200	32,000	39,200	47,600
	Cleveland/-Columbus	26,700	32,700	37,900	21,900	26,300	31,900	31,900	38,600	46,200
	Detroit	29,100	33,700	38,400	23,100	25,200	32,600	31,000	39,200	48,300
WEST NORTH CENTRAL	**Kansas City**	29,000	33,800	38,100	23,300	26,600	31,800	30,200	36,100	43,800
	Minneapolis/-St. Paul	27,900	33,300	37,800	23,100	26,000	32,500	30,200	39,600	46,800
	St. Louis	28,600	33,900	38,900	25,100	29,300	35,100	30,400	42,700	55,000
SOUTH ATLANTIC	**Atlanta**	28,100	33,500	37,000	19,200	24,400	30,400	29,600	37,500	46,800
	Miami	27,500	29,400	35,500	21,700	25,000	28,000	29,100	34,200	42,500
	Washington, D.C.	29,500	35,200	40,400	19,700	26,000	31,800	32,900	39,000	52,600
SOUTH CENTRAL	**Dallas/-Ft. Worth**	27,600	32,700	38,300	22,700	25,400	31,600	29,900	37,000	45,900
	Houston	29,700	34,100	38,500	21,900	26,900	33,100	29,200	38,700	46,800
	New Orleans/-Baton Rouge	27,500	29,400	34,000	18,800	22,600	27,600	27,400	34,000	42,100
MOUNTAIN	**Denver**	28,100	32,200	37,300	22,800	24,900	31,900	30,300	36,600	45,200
	Phoenix	28,000	32,900	36,900	20,700	25,600	31,700	27,900	35,700	43,800
PACIFIC	**Los Angeles**	30,100	35,200	39,800	24,000	28,700	35,500	33,900	41,400	51,700
	San Francisco Bay Area	30,200	35,100	39,800	23,100	28,100	35,100	34,400	42,700	53,400
	Seattle	27,500	33,200	37,100	22,300	25,800	30,900	28,700	36,400	43,500

tion as one using IBM 370/125 or smaller systems, medium as one using systems ranging from an IBM 370/125 to a 370/145 and a large installation as one using systems bigger than the 370/145.

As an example, salaries in San Diego were generally lower than the median salary for the nation as a whole. The San Diego median for systems and programming managers over the last 12 months was $28,200 in small installations, $33,500 in medium shops and $36,100 in large installations.

Operations managers in the San Diego area earned $22,800 at small sites; $27,000 at medium firms and $32,500 at large installations. Information systems directors in small San Diego DP shops garnered $30,200 last year while those in medium installations earned $37,100 and $43,800 in large sites.

In nonmanagement positions, commercial programmers and programmer analysts with up to one year's experience earned $14,700 in San Diego. Those with one to two years' experience earned a median salary of $17,600, those with two to four years of experience earned $19,800 and DPers with more than four years of experience garnered $23,800.

Last year, systems programmers in San Diego with one to two years of experience earned $19,700. Salaries reached $23,500 for those with two to four years of experience, topping off to a median salary of $29,000 for more than four years of experience.

Senior analysts, project leaders and consultants with two to four years of experience earned a median salary of $21,800 in San Diego last year. Those with four to six years of experience earned $26,600 and those with more than six years of experience earned $30,600. More salary information by city can be found in the accompanying charts.

All salary figures are based on median figures with the upper and lower 15 percentiles in each category eliminated.

The survey is available free of charge from Source EDP at 100 S. Wacker Drive, Chicago, Ill. 60606 or from any of its regional offices.

> *Information systems directors at large installations in New York earned a median salary of $63,000. New Orleans residents with the same position earned $42,100 — a difference of more than $20,000.*

Quality Books Hits Burroughs With Fraud Suit

By Tim Scannell
CW Staff

NORTHBROOK, Ill. — Quality Books, Inc. has filed suit charging Burroughs Corp. with fraud, breach of warranty and violation of the state's Deceptive Business Practices Act. The suit asks $855,000 in actual damages and $1 million in punitive damages plus assorted fees and costs.

Quality Books, a publisher and wholesaler, attracted international attention earlier this year when it placed an advertisement in a *Wall Street Journal* claiming that Burroughs had misrepresented the B800 computer sold to the company more than two years ago [CW, Sept. 8]. In the ad, Quality Books charged that it was the victim of "overly zealous computer salespeople" and asked to hear from similar "unhappy users."

To date, more than 400 users have written or called Quality Books from such far away spots as Monaco, France, Italy and the UK. A small percentage of people responding to the unconventional ad have been "intimately connected" with Burroughs as former employees, and their input will be used as evidence to back up the publisher's suit, according to Tony Leisner, Quality Books' vice-president and general manager.

Busy on Phone

"We're still spending as much time on the phone with other disgruntled Burroughs users as we are doing our own book business," he added. "A bad Burroughs B800 is just as bad in Italy as it is in Chicago."

Filed in federal district court, the suit was initiated by Quality Books when Burroughs allegedly did nothing to solve the user's system problems by an Oct. 14 deadline.

The original deadline was Sept. 14, but at Burroughs' request it was extended by 30 days to give the vendor a chance to investigate the problems.

Request Rebuffed

Burroughs then requested a second deadline extension, but was rebuffed because "we see that as a delaying tactic," Leisner said. Burroughs reportedly has a clause in its sales contract with the book publisher that limits any legal action to two years after a system is delivered; the B800 was delivered nearly a year ago, according to Leisner.

Presently, Quality Books has the inoperative computer stored in a corner of the office "gathering dust," he added. The company is continuing to make payments for the machine to a third-party leasing firm.

When contacted, a Burroughs attorney declined to comment on the suit or Quality Books until he could review the court documents.

Arson System To Put the Heat On Landlords

CHICAGO — A Computerized Arson Prevention System (Caps) set up by the Department of Public Safety here may help take the heat off Chicago's buildings by putting it on the landlords and property owners.

"We are working on the premise that arson is at least in part a predictable offense. Buildings that burn are different from those that don't," said Mark Iris, senior operations research analyst at Chicago's Department of Public Safety.

To help identify torching candidates, information such as outstanding building code violations, property tax assessments and information concerning previous fires will be collected from other city departments. Iris said the police, fire, housing, law and inspection services offices are cooperating.

This information will be processed by the city data center's IBM 370/158 using software developed by SAS Institute, Inc. of North Carolina.

When fully staffed, the experimental Caps program, funded for one year by a $150,000 federal government Community Development Program grant, aims to have four community research specialists in the field who will collect and verify data and approach landlords of properties the computer has identified as potential fire hazards.

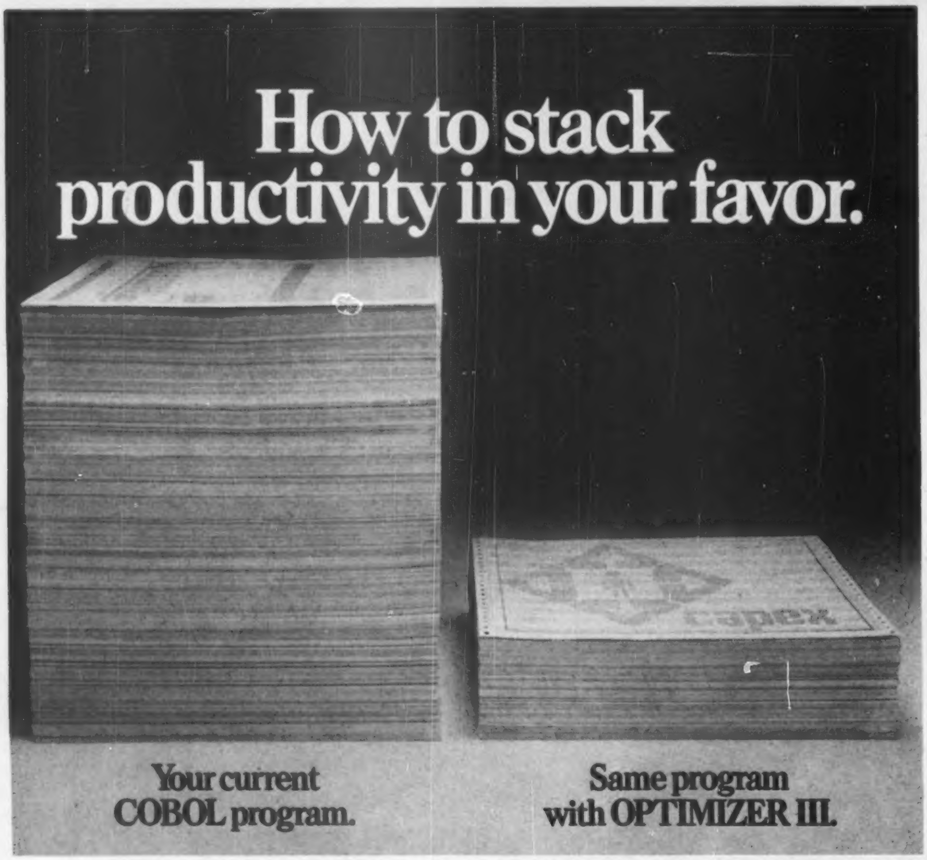
Two Test Areas

The experiment is being tested in two areas pinpointed for their high-risk nature, Uptown Edgewater and West Town. Last year Chicago had 12,000 fires citywide, of which 2,000 were officially attributed to arson.

Iris insisted that the fieldworkers are not an accusatory task force; they cannot bring about any criminal proceedings themselves, but only hand the information over to the police. However, he did acknowledge that "there is an unwritten component in the fact that simply by meeting with the landlord, one is essentially letting him know that the city knows there is a problem."

The landlords are given incentives to protect their property because by an arrangement with the housing department the buildings are put on a high-priority list for housing rehabilitation funds.

If the landlords fail to heed the advice given by the fieldworkers who "inform them of the risk," they may find that their buildings come up for reinspection sooner or the prosecution for neglect of property process is accelerated, Iris said.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Offenders Using Employers' CPUs

Program Bootlegging on Rise, Instructor Says

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO – Growing numbers of programmers are illicitly using their employers' mainframes to develop bootleg software for the home and commercial microcomputer markets, a university instructor and consulting firm executive said here at a recent conference.

"Programmers are moonlighting and bootlegging more than ever before," according to Dr. Robert Stumpf, a faculty member at California State Polytechnic University in Pomona. "If someone were to conduct an audit of some of the large computing installations in Southern California and elsewhere, I suspect you'd find a lot of processing time that couldn't be readily accounted for."

Many of the low-cost software packages currently available from the U.S.' home and hobby computer stores are probably being produced by unscrupulous programmers who already hold down full-time jobs but who have decided to moonlight to earn extra income, Stumpf said during a presentation at the recent Mini/Micro Conference and Exposition.

Such programmers usually develop their bootleg software with the help of computing time they steal from their unsuspecting employers' mainframes. They then sell the finished programs, which are often produced during regular working hours, on the open market.

Stumpf regards the growth in the number of bootleg programs – many of which are allegedly inferior in quality – as a "danger signal to the software industry that it had better start soon to clean up its act."

Stumpf – who, in addition to teaching at Cal Ploy, helps run a Southern California consulting and software firm – made his remarks as one of the speakers at a Mini/Micro session entitled "Small Business Systems: the Next Five Years."

In other comments, Stumpf predicted the imminent emergence of a new generation of sophisticated macro languages that will allow users to generate large volumes of code with just a handful of instructions. The macro languages, which are expected to appear no later than 1985, will represent a significant technical advance over their modern-day counterparts and promise to boost programmer productivity by drastically streamlining the production of software packages.

Stumpf also predicted a significant growth in maturity for the mini- and microcomputer-based software business during the 1980s, especially in the area of program maintenance. In the past, he said, users and vendors alike have tended to underestimate the importance of trying to predict software maintenance costs and have lumped them together with other major expense items like development and overhead.

Today, however, the mini and microcomputer software field is beginning to show some sophistication and is not only figuring maintenance costs into its initial price quotations, but is also listing the costs as separate expense items in its contracts. The trend toward quoting maintenance costs separately is expected to continue well into the future, Stumpf said.

But although the mini and microcomputer software industry is expected to come of age during the next few years, the field still faces some major challenges that have yet to be fully addressed.

One such problem is that many users have grown so accustomed to high-reliability hardware that they have allowed themselves to become slipshod about backing up their files.

Stumpf urged users not to let the seeming indestructibility of their hardware lull them into a false sense of security. To the contrary, file backup remains as crucial a user concern as it ever was.

Sooner or later, even the most reliable hardware breaks down, and users have to prepare their systems thoroughly for such a contingency or run the risk of facing disaster, Stumpf said.

Meet to Discuss Upping Quality Of Applications

CHICAGO – "Assuring Quality in DP Applications" is the title of a conference the Data Processing Mangement Association's (DPMA) Education Foundation will hold here April 1-3.

With tutorials that cover the establishment of the quality assurance function, tools and techniques for improving application performance, the management of structured design and the design implementation and enforcement of application standards, the conference planners hope to provide an understanding of the "how-to's" of improving applications.

Registration fees and details are available from 12611 Davan Drive, Silver Spring, Md. 20904.

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Rise Expected in International Circuit Costs

By Phii Hirsch
CW Washington Bu.eau

WASHINGTON, D.C. — The leasing of international private-line circuits is likely to become more expensive — and complex — in the next few years, according to a recent study discussed here last week.

The study, conducted by Telecom Systems Group, Inc. of Cedar Grove, N.J., reflects information collected from some 60 foreign telecommunications administrations.

About 10% of the respondents reported they have transborder data flow regulations and restrictions now in effect, according to Leonard Elfenbein, president of Telecom Systems Group, and about 7.5% of the sample "classify" or specify the kind of traffic that can be carried over their private-line service. Elfenbein expects both types of restrictions to increase substantially in the immediate future.

There is also a trend toward basing communications rates on the gold franc and requiring payment in local currency — which has the effect of increasing rates during periods of inflation.

Other Findings

The study also revealed that 76% of the responding carriers allow data to be transmitted on their public telephone networks, 70% do not allow an international circuit to be terminated within their countries in PBX/PABX equipment (thereby preventing a foreign user from accessing the country's entire domestic telephone network through a single circuit), 21% allow use of digitized voice equipment on an international circuit (increasing the amount of traffic it can carry), 17% offer "hubbing" discounts (which tend to reduce termination charges), and although surcharges are imposed in most cases, and 38% permit shared use of circuits leased to multinational on-line service bureau.

Elfenbein discussed the study at a conference on international telecommunications policy sponsored by his company. The meeting included speakers from the Federal Communications Commission (FCC) and the U.S. State Department, who expressed sharply differing views about formulation of this country's international telecommunications policy — particularly the FCC's recent proposal to remove restrictions on resale/-sharing of international circuits.

The proposal has been loudly criticized by foreign telecommunications carriers, U.S. international record carriers and many of their customers. The only major supporter, aside from the FCC, is the National Telecommunications and Information Administration (NTIA), the President's chief telecommunications adviser.

Michael Cummings, chief of the FCC's International Facilities Planning Division, stressed that the proposal is tentative and that comments from interested parties will be carefully considered before any final action is taken. Cummings added that the commission "recognizes" it can not act unilaterally, that the views of foreign carriers must be weighed.

However, Arthur Freeman, director of the State Department's Office of International Communications Policy, thought it "would have been advisable" for the commission to solicit and consider foreign carriers' views before, rather than after, proposing to do away with international resale/sharing restrictions.

Pointing out that "there have been any number of instances where we and others in the Executive Branch have been discomfited by FCC actions," Freeman indicated that the State Department intends to push for corrective action next year, when Congress is scheduled to consider new international telecommunications policy legislation.

Specifically, the department wants the FCC to be required to weigh the foreign policy implications of its decisions. Now, the only standard is "public convenience and necessity," which has not been adequately defined, Freeman said.

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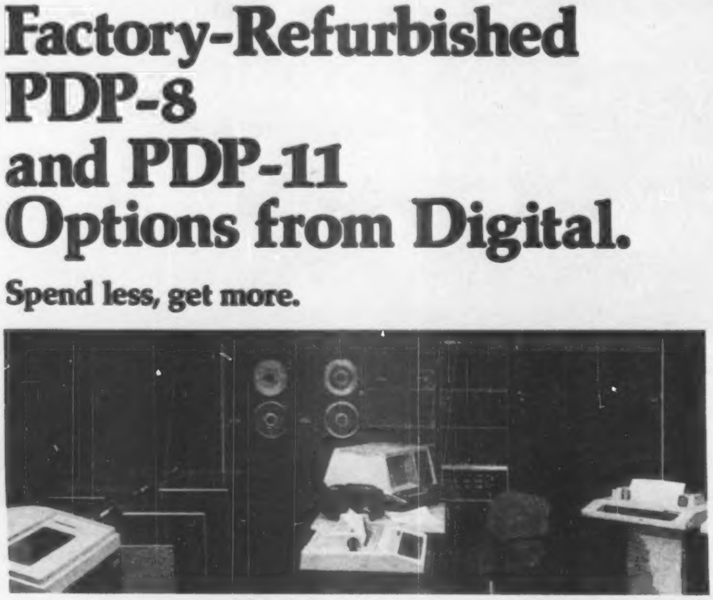

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GAO Urges Computer Role In Federal Building Design

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — With the issuance of a recent General Accounting Office (GAO) report, Congress has begun prodding federal agencies to use more computer-aided design methods in government building projects.

"Federal officials and agency procedures and practices often limit and/or hamper the use of computers on federal projects," the congressional auditing agency said.

"In comparison to manual methods," the GAO noted, "computers can enable designers to produce higher quality, more effective facility planning and architectural designs" as well as "reduce the amount of energy consumed by buildings."

The problem, according to the GAO, is that agencies "generally have not created an environment wherein the efficient use of computers is possible" in building projects.

In fact, the report stated, computer-aided design is rarely even discussed during contract negotiations. This was attributed to lack of understanding of these methods on the part of agency officials and "the restrictive procedures and actions in contract negotiations and project management."

Accordingly, the GAO recommended changes in procurement procedures "to create an environment more conducive to greater, more efficient use" of computer-aided design methods by:

- Educating agency personnel about the capabilities and use of computers in design.
- Requiring that computers be used for those analyses and design functions that can be done efficiently only with computers.
- Evaluating computer expertise when selecting architects and engineers for federal projects.
- Discussing planned computer use during negotiations.
- Revising fee proposal formats to recognize the role of computers in design and clearly identify the services that will be provided under the contract.

The GAO said its survey of architectural and engineering firms "indicates that the number of firms having computer capability or access to computer services is sufficient to provide adequate competition should agencies actively seek computer expertise for federal projects."

But Big Users Face Wats Rate Hike

FCC Bans AT&T's Resale/Sharing Restrictions

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission (FCC) last week ordered AT&T to eliminate tariff restrictions barring the resale/sharing of Message Toll Service (MTS) and Wide-Area Telephone Service (Wats) — the phone company's two major long-distance telephone services. The commission's major aim is to promote competition and thereby make market forces rather than government regulation determine prices.

Under the order adopted last week, the resale/sharing restrictions can not be lifted for at least five months. In a discussion that preceded last week's vote, the FCC commissioners made it clear they want resale/sharing of Wats to be based on new rates — recently filed by the phone company and scheduled to become effective next month — rather than on existing rates. However, since these new rates increase charges for heavy usage of Wats circuits, while reducing charges for smaller volume users, the opportunities for resale and sharing will be reduced.

The reduced rates for smaller volume customers are also in jeopardy.

Objections Filed

Several large Wats users filed objections to the new tariff last week and have made it clear, unofficially, that they will take their case to court if the FCC allows the new tariff to become effective next month.

The objectors include Avis, Inc., Budget Rent-A-Car Corp. and National Car Rental Systems, Inc. They said the new tariff will increase telecommunications costs of the car-rental industry by $8 million to $18 million a year and will raise the cost of a car-rental transaction by 50 cents to $1.

Objections were also filed by several firms using computer-based services. GTE Telenet Corp., which operates a nationwide packet-switched network, objected to basing charges on the average usage of each Wats line in a service group. Under this scheme, the company said, a customer who subscribes to nationwide (Rate Step 18) Wats service, has 240 hours of Wats traffic a month and employs two access lines pays less than another customer subscribing to the identical service who leases three access lines.

If the commission allows AT&T to base its rates on average instead of actual usage per lines, said GTE Telenet, the bigger Wats users will lease fewer access lines, causing queuing delays that will impact all Wats customers.

'Unreasonable Discrimination'

MCI Telecommunications Corp., which was largely responsible for forcing AT&T to draft a new Wats tariff, said the phone company's proposed rates create an "unreasonable and unjust discrimination" between Wats and MTS.

The company's key contention was that because the two services use identical facilities and have been found by the commission to be "like," the phone company can not charge less for Wats than for MTS — as it does in the proposed tariff — without showing that the costs of the former are less than those for the latter service.

Although AT&T has filed 37 volumes of backup material with the new tariff, it has failed to provide this justification, MCI added.

The General Services Administration (GSA), commenting on behalf of several federal Wats users, said the proposed tariff does not reflect the demise of Telpak, which is scheduled to occur next Dec. 21. That development will reduce the phone company's costs while increasing its revenues — by causing Telpak users to shift to more expensive private-line circuits, GSA said. If, in addition, the proposed Wats tariff becomes effective, AT&T's overall rate of return will exceed 10.5% and thereby violate a commission order issued last June which limited the phone company's profits to that level.

An FCC official, asked what would happen to resale/sharing if the newly proposed Wats rates are delayed by a court stay or injunction, said the commission would "put off resale/sharing. They definitely won't permit it on the basis of the present tariff."

Rewrite Bill Seriously Flawed, Judiciary Committee Reports

CW Washington Bureau

WASHINGTON, D.C. — Much-debated legislation to amend the Communications Act of 1934 was torpedoed by the House Judiciary Committee last month because the bill (H.R. 6121) contained serious flaws and there wasn't enough time left in this Congress to correct them.

So said the committee in a recent report.

To make the bill effective would have required increasing the authority of the Federal Communications Commission to regulate AT&T, "truly" separating Bell's regulated and deregulated activities to prevent cross-subsidies and preserving a 1956 consent decree which bars the phone company from offering nontariffed services.

In a separate statement, Rep. Jack Brooks (D-Texas), a member of the Judiciary Committee, called H.R. 6121 "nothing more than a mechanical restructuring of the common carrier industry."

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But Not Without Problems

IRM Seen Cure for Unwieldy Management

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The federal government trend to more centralized information management, while not without problems, may be the best hope to overcome the unwieldy management structures of many modern, information-dependent organizations, both public and private, according to a Library of Congress researcher.

In a number of federal agencies and private corporations there are typically too many people responsible for too many different information resources with too little coordination between the various information fiefdoms, Louise Becker told a recent National Bureau of Standards (NBS) symposium.

"We lack effective and democratic exchanges" in information management, she said. "Library people talk to library people, the DP people will only talk to God; managers talk to managers."

The increasingly popular management concept of information resources management (IRM) might solve some of these problems, might "bring us all closer together," according to Becker, an information sciences analyst with the Library's Congressional Research Service.

While lacking a precise, universally accepted definition, IRM generally refers to a management structure coordinating authority over traditionally independent functions such as DP, telecommunications, word processing, data base management, standards making, paperwork management, systems development, library and other information resources, as well as privacy and security, to name just a few.

"Historically, information management has been a fragmented activity shared among the traditionally independent elements of an organization," Becker noted in a recent study presented to the NBS symposium on IRM.

"With merging technologies, exemplified by the integration of computer-communications and other information technologies, the requirement to examine all aspects of information handling as a cohesive whole becomes critical," she said.

A more coordinated approach to IRM by federal agencies has been suggested in the last few years by several commissions and study groups looking at federal paperwork management and DP policies and practices.

Also, the pending "Paperwork Reduction Act of 1980," which would mandate centralized agency management of information facilities, had added impetus to the move to IRM techniques in the federal government.

Several Implementations

Several offices, including the Interior Department and the Defense Intelligence Agency, have already adopted some IRM concepts in their management structures, Becker noted.

Interior, for example, has reorganized to establish an Office of Information Resources Management with three divisions: DP and Telecommunications Management, Systems and Analysis, and a Center for Information and Library Sciences.

These divisions are responsible, she said, for management and operation of automated and nonautomated information systems, departmental DP and associated technologies, operations and planning functions, library and related information services, word processing, micrographics, paperwork management and telecommunications activities.

While the precise method of IRM implementation will vary from organization to organization, the concept typically involves coordinating the functions of policy management, budget, procurement and technical services, bringing together in one office responsibility for, among other things:

- Developing information objectives;
- Developing and planning for reporting requirements;
- Establishing, interpreting and managing information policy;
- Allocating resources and support;
- Planning for immediate-, middle- and long-range information requirements.

Assessing the benefits of IRM, Becker said "it may provide a framework in which information policies and practices may be consistent with the requirements and needs of the organization."

It is also "believed to be more responsive to changes in statutory, regulatory and other policy considerations," she said.

But, she added, "it may fail to bring about democratic exchanges and sharing of responsibility necessary by distinct statutory language or specific authorization." In addition, "concentration and consolidation of critical management functions within an organization causes some problems.

"The centralization of information management responsibilities in an IRM office may concentrate too much power there and may usurp prerogatives traditionally reserved for key decision makers."

Therefore, Becker warned, "if the IRM concept is interpreted broadly to include activities associated with budget, procurement, policy and information-support services, it could represent a special danger to managers of existing organizational units."

Also, "the concentration of power, while serving the interest of efficiency, may not be in keeping with other values of an organization."

A "clear articulation of the goals and objectives, as well as [an] understanding of the mission of an organization" is necessary to "striking a working balance" in instituting IRM, Becker said.

Monthly Covers Communications

MILLBURN, N.J. — "Competition & Strategy" is the title of a new monthly publication devoted to the subject of emerging competition within the telecommunications industry.

Published by Probe Research, Inc., the publication reportedly offers its readers both news and interpretive articles on telecommunications and related competition, including company news, technological changes, market analysis and legal and regulatory development.

A one-year subscription to the service is $140. Further details are available from Sharon Scheckel at Probe Research, Inc., P.O. Box 251, Millburn, N.J. 07041.

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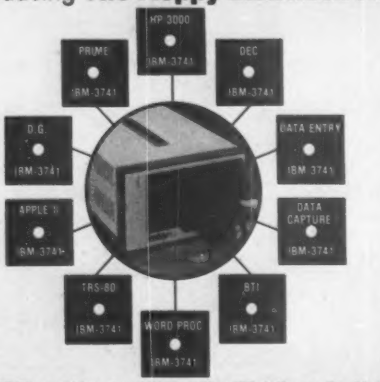

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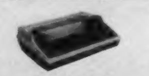

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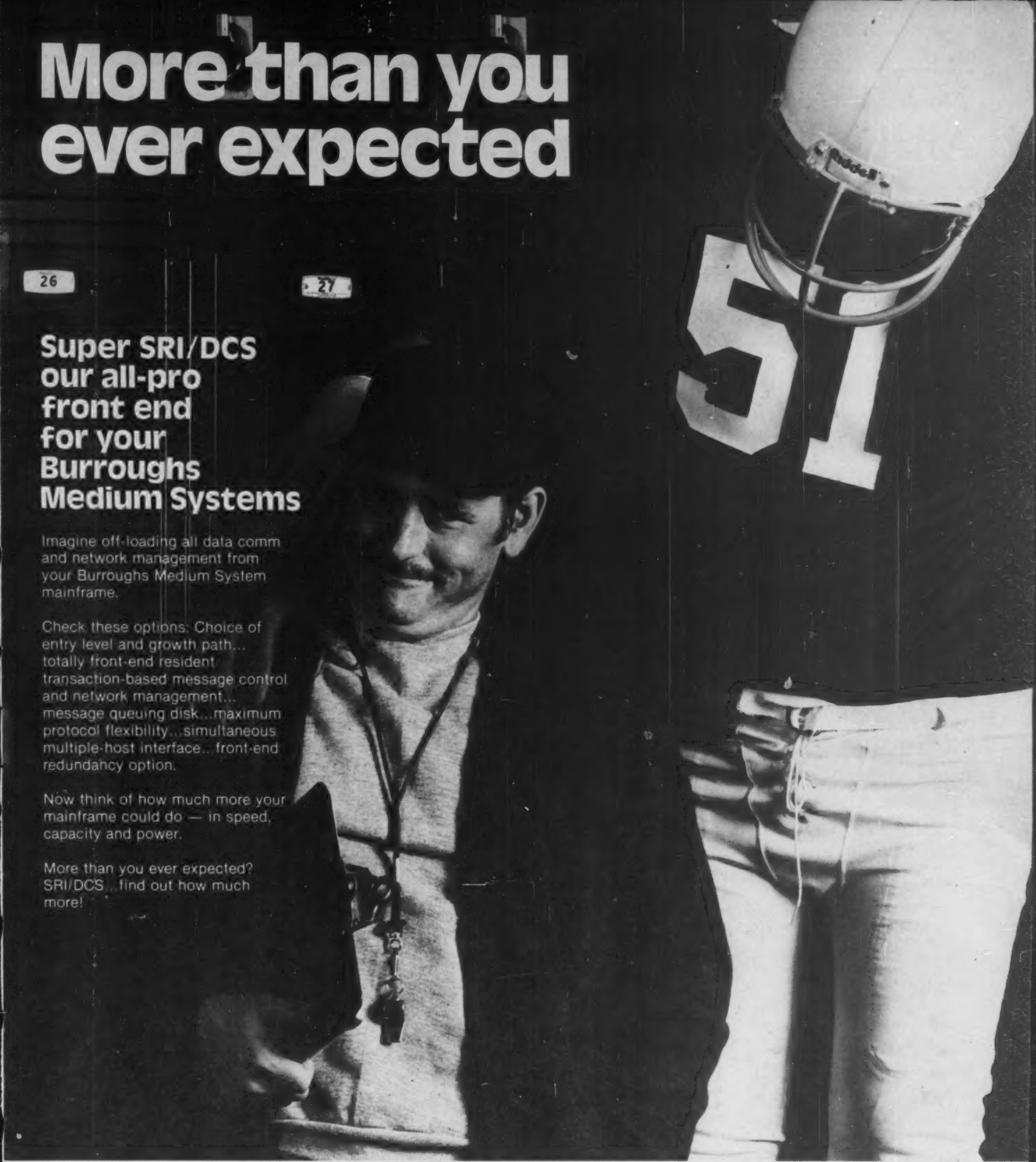

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'No More Overtime'

Analyst Lands in Jail for Making Extra Effort

By Ann Dooley
CW Staff

HANOVER, N.H. — Wayne Christian doesn't plan to work overtime anymore. He made that decision while spending a night in jail.

Christian, an analyst at Dartmouth College's Medical School, was arrested in his office late one recent Friday night on charges of criminal trespass. Christian, who lives 30 miles away from the Dartmouth campus, was working late and decided to spend the night in his office since he planned to meet his employer there the next morning.

"That's the last time I'll do that again," Christian vowed. At 1 a.m., the systems analyst was awakened by two campus police who informed him it was improper to stay in offices after hours. Christian was subsequently arrested and spent the night in the Hanover city jail.

Although other cell mates — arrested for violent crimes — were allowed to leave on personal recognizance, Christian was forced to spend the night in jail and was only released when his employer came the next morning to vouch for him, he said.

Not Over Yet

Christian's ordeal did not end there. A trial date was set and Christian found himself facing the possibility of one year in jail and/or a $1,000 fine.

However, Dartmouth dropped the charges against him, a move which in Christian's opinion was probably done because the college decided there was no benefit in pursuing it. Dartmouth is currently considering revising its regulations against working late, Christian noted.

Christian, who was unaware of the overnight regulation, stated his only purpose in staying in his office was to assist in his work the next day: "I thought I was doing them a favor in coming in on the weekend."

Christian is a specialist in the construction of large statistical and mathematical models. His work involves determining the nature of the distribution of demand for medical care in New England towns throughout econometeric analysis of epidemiological data.

The whole affair was "bizzare," Christian said. "You hear so many complaints about declining productivity, and when someone puts in an extra effort they get arrested."

A Dartmouth spokesman called the incident "unfortunate."

Lecht Wonders What He Said To Cause Ouster

By Connie Winkler
CW Staff

PHOENIX — It is not unusual for an audience to walk out on a speaker, but it is rare for a speaker to walk out on his audience — especially at the sponsor's request.

"I don't know what it was I said unless it was that IBM was going to go into the communications business competing with AT&T and American Express," panned Charles Lecht, president of Advanced Computer Techniques Corp., an IBM pundit and a regular speaker on the computer talk circuit.

Whatever it was Lecht said, American Express Corp. brass didn't like it. Well into Lecht's talk to top American Express data processing executives in Phoenix Oct. 15, he was asked to leave.

According to Lecht, while the lights were dimmed for his slide presentation, T. Michael Ball came up on the stage, took Lecht's arm, turned him aside and said: "You've offended enough people. Terminate your talk."

Ball came to American Express about three months ago as senior vice-president in charge of worldwide computer and communications systems after 21 years with IBM's Data Processing Division, most recently as a vice-president for new product development.

Quick Synopsis

Lecht said he turned to the audience, apologized if he had offended anyone and offered a 30-second synopsis of what he would have said in the remaining 10 minutes of his talk. He then left the predinner gathering.

When he was interrupted, Lecht said he was predicting the downfall of the computer industry as it is now and the emergence of a new and highly regulated information industry. Lecht, who addressed a similar American Express group two years ago, also predicted "IBM would plunge headlong into the computer service bureau business, competing with many of its own customers."

IBM has been banned from entering the service bureau business because of consent decrees obtained by Control Data Corp. and Univac. However, in 1981 IBM will no longer be bound by the decrees.

Lecht remains puzzled about why he had to terminate his presentation. "Maybe," he mused, "it was that I said the IBM System 138 had been held hostage in Sri Lanka for nine months."

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Notes and observations from IBM
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At Pioneer, Order Processing Is High Fidelity Too

Pioneer Electronics Corporation books 50 percent of its business in the last week of each month.

"Before we had an online computer system," says Adrien Robichaud, "it took a week after the peak period to catch up on invoicing and other paperwork. Now customers are invoiced promptly, resulting in a significant cash-flow gain.

"We no longer need temporary help for the rush, and there are far fewer invoicing errors." Robichaud is director of management information systems for the U.S. importer and distributor of Pioneer stereo and home electronic equipment. "Each order is handled manually once, when it is keyed into the terminal at the branch office," he notes. "An automatic computer edit immediately notifies the operator of any keying error."

The system verifies that the item is available in the warehouse nearest the customer, reserves inventory, and checks the credit status of the customer. An IBM 4341 prints the warehouse picking and shipping documents remotely, in the warehouse.

There are four stocking locations, in Illinois, Texas, California and at company headquarters in Moonachie, New Jersey. "If the nearest warehouse is out of stock on critical merchandise," Robichaud adds, "the system can locate it at another site and redirect the order. This has improved customer service and saved us a lot of telephoning around."

After the order is picked, the computer calculates the shipping weight and prints the bill of lading, extends the invoice, and prints it remotely at the branch office. "There are fewer inquiries regarding errors in shipments or invoices," Robichaud continues, "and fewer payments held up while disputes are resolved. The system has facilitated the processing of back orders, and helps us consolidate back orders with current shipments."

The online system has also become an important management tool, he explains. A marketing executive can use a terminal inquiry to see current inventory at any location, or current sales throughout the company.

Accurate data for sales forecasting is now readily available, and a specific query (for example, how many of one type of speaker are at each location) can be keyed into a terminal. One five-page report on orders and shipments that formerly took many hours to compile is now done in five minutes.

"Corporate management has more confidence in the operating data," Robichaud points out. "They make decisions based on current reality. If a marketing program is not working as it should, they can make immediate adjustments."

A Pioneer stereo turntable is tested functionally and inspected for surface flaws. Online order processing at Pioneer improves customer service, increases cash flow, and yields better decision-making information for management.

Accelerating Vehicle Design at Clark Equipment

CLARK
CLARK

Clark Equipment Company is a leading maker of lift trucks. To shorten the time required for design of new model families, Clark adopted CADAM for design and drafting.

"It has brought in enthusiasm and taken the drudgery out of design." Jack Squier of Clark Equipment Company is describing the Computer-Graphics Augmented Design and Manufacturing (CADAM*) system. "Under the old method, when you got an idea, you stopped thinking for 4½ hours while you drew a picture."

Squier is manager of new product development for Clark's Industrial Truck Division, headquartered in Battle Creek, Michigan, which makes lift trucks and related vehicles. The division wants to accelerate the design on new model families. "CADAM has cut the cycle by at least a third," he states. "We can make a layout in one day that would have taken five or six.

"CADAM enables us to build better engineering prototypes. It eliminates most drawing and arithmetic errors, and gives us more flexibility in trying alternatives and modifying a design."

To illustrate, Squier cites the case of an assembly drawing of a truck which had to be lengthened by one inch. "It would have taken 15 weeks to lengthen all the tubing, wires and frame members," he points out. "With CADAM, the designer made the changes with a few strokes of the light pen and touches to the keyboard."

Another interesting design problem is a wheel that moves up and down as it is steered, in order to keep the truck horizontal. To verify that there were no interferences, they needed to define the external envelope of its motion, and this required plotting its geometry at half-inch increments.

This was completed in three hours at the IBM 3251 Graphic Display Station by a man with two weeks of CADAM training, Squier states. "It would have taken 2½ weeks at the drafting board.

"We can do more accurate layouts, showing more details. It's easy to duplicate and erase a drawing, creating multiple copies of a basic layout for different purposes. CADAM helps us assure that parts can be assembled."

Adds Jim Bauer, vice president of engineering for the division: "CADAM is so productive we can't afford *not* to extend it to other industrial truck engineering locations in Kentucky and Germany."

*CADAM is a registered trademark of the Lockheed Corporation

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Managers on the Move

ROBERT M. HORTON has been named senior vice-president and head of Trusco Data Systems (TDS) administration by the directors of the Trust Company of Georgia, Inc., an Atlanta-based bank holding company.

Following service in the U.S. Army, Horton joined the staff of TDS as a junior programmer. He was elected an operations officer in 1968, elevated to assistant vice-president in 1972, and promoted to vice-president and general manager in 1974.

Horton attended Emory-at-Oxford, Covington, Ga., later receiving his B.A. degree in literature from Emory University in Atlanta.

• • •

Ethyl Corp. of Baton Rouge, La., has elected KARL F. CAST as vice-president of engineering, central systems and DP. Cast has been manager of these departments since 1975.

Cast joined Ethyl in 1952 as an economic analysis engineer in research and development (R&D) at Baton Rouge. Over the years he has held the positions of assistant superintendent of projection coordination, engineering department; superintendent of R&D technical services; and general superintendent of R&D, engineering services.

From 1962 to 1964 Cast was associated with Bechtel Corp.'s refinery and chemical division. He returned to Ethyl as general manager of operations, and was later named director of central systems and DP.

Cast has a B.S. degree in chemistry from Lawrence College, Appleton, Wis., and an M.S. degree in chemical engineering from MIT.

• • •

SERGIO MASSA has been appointed vice-president of DP for Cardinal Marketing, Inc. in Miami.

Prior to joining Cardinal, Massa was associated with Jefferson/Ward, Inc. of Miami and Ideal Toy Corp. of New York, holding positions in telecommunications, DP management and systems analysis.

Massa received a B.S. degree in business administration from New York Institute of Technology.

• • •

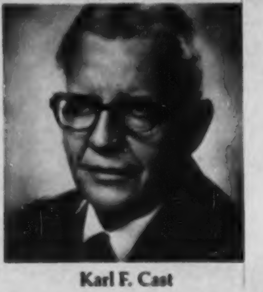
ARTHUR C. BROWN has joined Health Data Network, Inc., Louisville, Ky., as manager of systems and programming. He will be responsible for designing medical data processing systems, developing staff expertise in health care information systems and information requirements of medical professionals.

Brown was previously manager of the systems group at Cybernetics and Systems, Inc. a subsidiary of Seaboard Coastlines, Inc. Prior to that he was a systems analyst with Univac, Greenville, S.C.

Brown received a B.A. degree in physics and business administration from George-

(Continued on Page 21)

Robert M. Horton



Karl F. Cast

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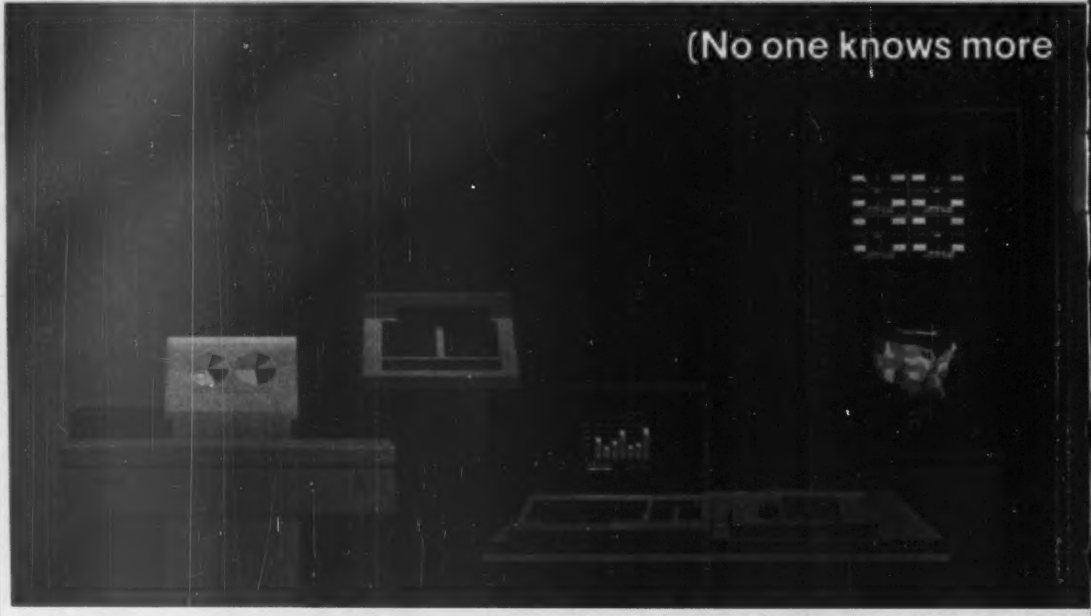
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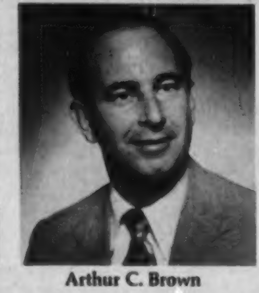
Managers on the Move

Sergio Massa


Arthur C. Brown

(Continued from Page 20)

town College, Georgetown, Ky.

Health Data is a subsidiary of Baptist Hospitals of Kentucky, Inc., serving five hospitals and several physicians in a multistate area.

• • •

JOHN L. DEAN has joined National Advertised Brands Scanning Reports, Inc., New York, as vice-president of information services. He will be responsible for input from retailers who supply data based on readings of the universal product code on items going through the cash register checkout and the continuing development of information systems for clients.

Dean was formerly corporate vice-president of management information systems for the Great Atlantic & Pacific Tea Co. (A&P), where he was responsible for organizing and administrating DP and telecommunications capabilities. Before going to A&P in 1975, Dean was senior vice-president of planning and research for Beneficial Management Corp. He joined Beneficial in 1953 as a research analyst.

Dean holds a B.S. degree in business administration from Lehigh University and received M.B.A. degrees from Fairleigh Dickson University in economics and finance and New York University in marketing and quantitative methods.

• • •

KENNETH M. KING has been elected provost for computing at Cornell University. He will be responsible for all academic and administrative computing at the university.

Prior to the appointment he was vice-chancellor for university systems at the City University of New York, where he was responsible for computer and information systems as well as for television systems and institutional research and reporting at the 20-college system. From 1971 to 1978 he was professor and university dean for computer systems at the university, later appointed deputy director of operations and director of the office of computer plans and controls. Prior to this he managed the central computer facility at Columbia University.

King received a B.A. in physics from Reed College and a Ph.D. in theoretical physics from Columbia.

• • •

LANDIS MACINTOSH has been elected staff vice-president in charge of computer management and information services at the Scott Paper Co.

MacIntosh has been director of the organization since 1972. He joined Scott in 1966 as a systems analyst and has held several positions in information services during his tenure with the company.

He graduated from Montclair State College, N.J. and currently resides in Lansdowne, Pa.

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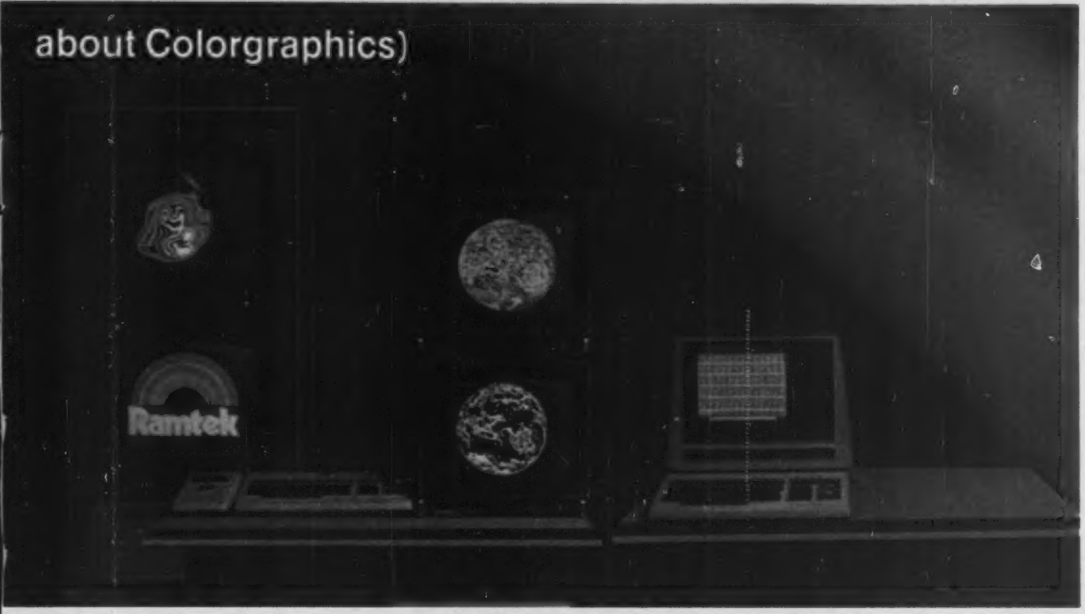
about Colorgraphics)



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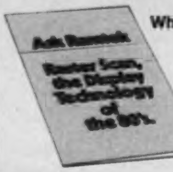
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Pictogram Output the Rage at Ifip in Japan,

Part 1: Tokyo

By Nancy French
CW Staff

TOKYO – The buzzword on the exhibit floor here at the first half of the International Federation for Information Processing's (Ifip) Congress 80 was "Japanese information processing." And the term wasn't being used to represent Japanese computer products, but rather products that allow Japanese users to print output in Japanese Kanji pictograms.

For about a year now, DP and word processing (WP) vendors have been announcing software, laser printers and high-resolution dot-matrix printers that allow users to print the complex Kanji along with Katakana, used to represent imported words; Hiragana, a kind of simplified pictogram-like character used to represent pronouns, conjunctions and tenses; and finally, the Western alphabet – for English and European languages. Output has been a serious problem.

The advent of Japanese information processing reflects recent advances in very large scale integration technology, low-cost laser printers, 16 by 16 and 24 by 24 dot-matrix printers and displays needed for Kanji input and output, a Japanese industry observer explained.

Ranked next in user interest at the show were the word processing and office automation systems. These also represented a kind of breakthrough for the Japanese office traditions. Except for the largest international trading firms, which employ standard international business practices and English-language typewriters, the typical Japanese office is small and populated with many clerks rather than secretaries – with no keyboard tradition. This may pose some problems for the Japanese as they leapfrog from handwriting to WP without stopping for typewriters.

Traditionally, if a business needed something printed a clerk would take a hand-written document to a Daisho, where professional typists, trained in operating the Wabun typewriter with 2,000-plus Kanji characters, would type Kanji to Kanji. Aside from the Daisho, only newspapers had the Wabun machines, a Japanese observer explained.

Other Notables

Other products notably numerous were color graphics terminals, plotters, small turnkey business sytems and 32-bit minicomputers for use primarily in networks.

The vendors with U.S. ties that displayed their gear at the show will not be left behind when it comes to Japanese information processing. Nearly all have signed agreements with Japanese firms for printing subsystems that will allow them to compete.

As for the plug-compatible market, it hardly exists in Japan. One observer explained that the Japanese have a tradition of single-vendor shops, although the influence of the multinationals may be changing that attitude.

Protocol Hodgepodge

As for distributed processing, the Japanese do it their own way. Most large companies have large DP centers with heterogeneous minis in remote locations.

This resulting communications protocol hodgepodge evolved from local autonomy in the acquisition of inexpensive equipment. And users were assured communications would be no problem. A trend toward homogeneous minis is emerging, an industry observer said.

The exhibition was jointly sponsored by Ifip 80, Medinfo 80 and the Data Show, Japan's biggest annual computer exhibition, which has been held every autumn since October 1973.

Shuttle buses ferried Ifip 80 attendees diagonally across the city of Tokyo half a dozen times each day to see the exhibition.

The displays, which numbered about 110, filled three buildings.

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While DDP Benefits Appeal to Australians

Part 2: Melbourne

By Nancy French
CW Staff

MELBOURNE, Australia — As a continent and a nation, Australia represents less than 1% of the world's computer market, yet it is one of the most competitive markets in the world.

Despite its small size and the logistical problems involved in servicing Australia, most U.S.-based mainframe and mini makers, independent software companies and peripheral makers compete for users' dollars here against both Japanese and German firms.

As one might expect, IBM's market share here is put at only 37%, compared with nearly double that percentage in the U.S. and a bit less on a worldwide basis.

Because of the vast distances between cities and the high communications costs, Australian users are interested in the benefits of distributed DP (DDP). All are looking forward to the launching of a geostationary satellite here next year, and nearly all the DP, WP and office automation system vendors doing business in this country were represented at the second half of the eighth World Computer Conference, sponsored by the International Federation for Information Processing (Ifip) here recently. The exhibition covered 16,000 square meters of space and included more than 170 vendors.

Biggest Ever

"This was the largest and busiest exhibition ever held here," said Ashley Goldsworthy, chairman of Ifip's Australian organizing committee.

Australians were comparing the show to the National Computer Conference. It was rated five to eight times bigger than the last biennial Australian Computer Society Conference and Exhibition in Canberra, the capital.

While last week's show was not the place to see a raft of new product introductions, the displays were extensive and well staffed.

Attendance was well up to expectations, according to Goldsworthy, who said by week's end that paying delegates numbered almost 1,800 and exhibition visitors totaled more than 30,000. About 162,500 free trade passes were distributed in advance by participating vendors.

Despite huge expenses involved in the two-part congress, both Ifip and the Japanese and Australian computer societies will have earned significant profits, he claimed. However, he declined to estimate how much.

The equipment displayed here was not the same gear shown in Tokyo, as was previously reported.

Meet to Address Government DP

WASHINGTON, D.C. — A national conference on government information systems will be held here Dec. 8-10, conducted by the Center for Policy Research. It will be geared toward government executives and managers with program delivery responsibilities.

Areas of interest the conference will address include how H.R. 6410 will change federal information collection requirements; access to public and commercial data bases; and computer fraud.

Further information is available by writing to Government Information Systems, 12611 Davan Drive, Silver Springs, Md. 20904.

Correction

In the article, "Patco Drumming Up Strike Support: FAA" [CW, Oct. 20], a recent traffic slowdown at O'Hare International Airport was described as being regarded by the Federal Aviation Administration (FAA) as "an international action aimed at manipulating the agency." The sentence should have read, "an intentional action . . ."

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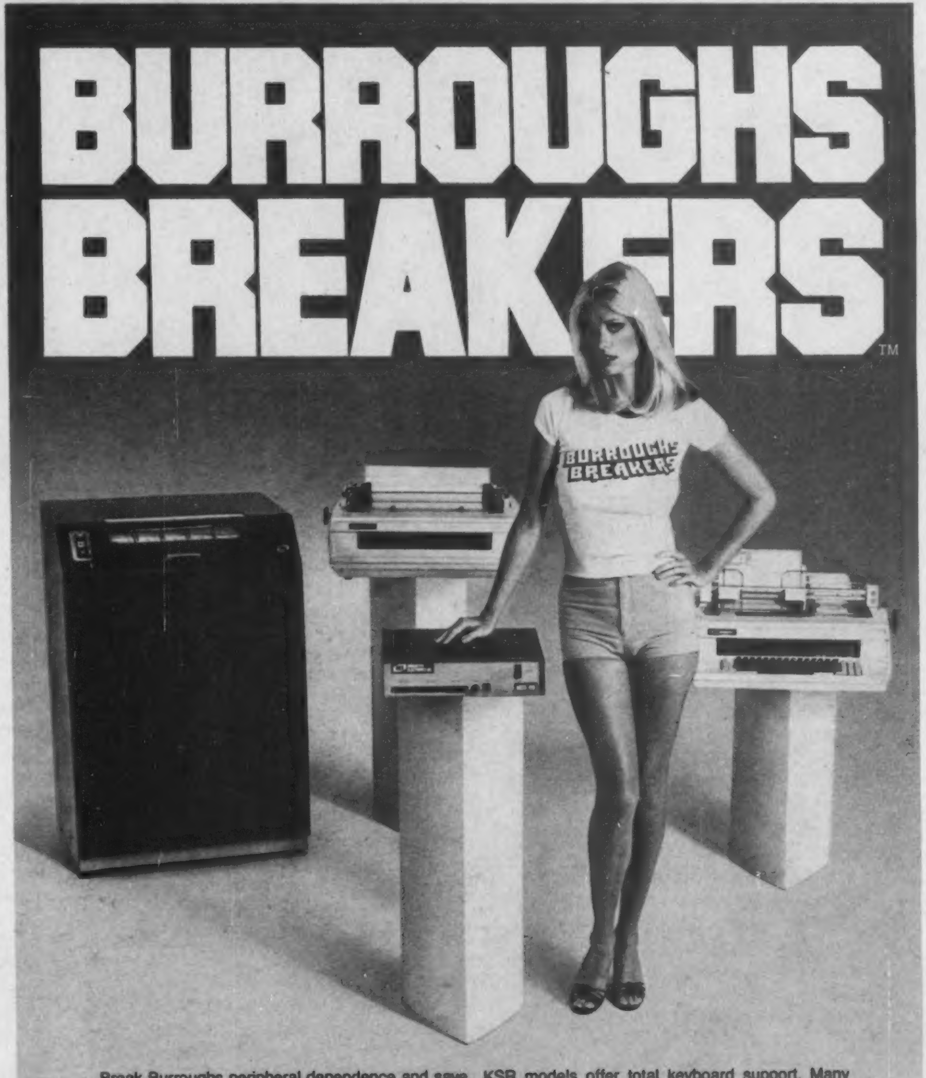

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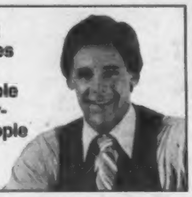

Contradicts Earlier Announcements

IBMer Admits 'System R' Bridge Not Possible

By Susan Coleman
Special to CW

MELBOURNE, Australia — An IBM researcher last week conceded the promised bridge that would allow IMS users to move to IBM's anticipated relational data base management system (DBMS) cannot be built.

This contradicts all IBM marketing announcements which have been used to prevent a migration of potential DBMS users to other data base systems.

Dr. Frank King, an IBM researcher at the firm's San Jose (Calif.) Research Center, made his surprising statement during a question and answer period following the presentation of a paper on relational data base systems.

Speaking at the International Federation for Information Processing's (Ifip) Congress 80 presented here last week, King further said that the performance of IBM's relational DBMS, code-named System R, is restricted by the CPU and not by I/O. "I am not optimistic that the availability of a super-fancy disk system would affect its performance," he added.

No Release Date

IBM's much vaunted DBMS is still unable to provide functionality at a satisfactory performance, King said, refusing to give a date when System R would be released.

While the data model embodied in airline control program (ACP) could achieve transaction times up to 100/sec and hierarchical models are achieving 20 to 50 transactions/sec, implementations of System R, which runs on IBM 370 and 30 series architecture, are restricted to between one and 20, he said.

Greater transaction times could be achieved, King said, but these would be at the expense of functionality. Since this was the primary purpose of the relational DBMS, there was little point in considering this option.

"To increase the performance of the relational DBMS up to that of hierarchical models will take time and clever programming," King said. "There is a tremendous amount of additional work to be done."

King said the performance was not restricted by I/O but rather by the CPU capability. "It is not I/O bound at all. In order to achieve reasonable performance, a multiprocessing system must be used," King said.

System R has been under test in "real" environments for several years. These tests had revealed that a simple select instruction which returned four records would require the execution of 167,000 instructions on a 370 machine. "You can handle 30 of these in a second on a 3033 type of machine," King said.

Adapso Offers Guide To Contract Dilemmas

ARLINGTON, Va. — "The Contracts Reference Directory" from the Association of Data Processing Service Organizations, Inc. (Adapso) is a series of installments covering the various types of agreements between vendors to, and clients of, computer services providers.

The first installment of the volume that attempts to solve all contract problems is entitled "A Program License Agreement with End User;" the second segment is called "A Professional Services Agreement;" and the third is "Computer System Agreement With End User." The work is loose-leaf bound and approximately 150 pages.

The directory costs $400, but installments are available separately for $150. Further details are available from Adapso at 1925 N. Lynn St., Arlington, Va. 22209.

Seminar to Cover DASD Management

SAN FRANCISCO — A free Direct Access Storage Device (DASD) Management Seminar will be held here Nov. 19 by Software Module Marketing, Inc. (SMM).

Arnold M. Roberts of ADS Associates, Inc. will discuss some of the problems facing the data center management team in dealing with information storge, accessing, backup and restoring. Formerly of Masstor Systems Corp. and the American Broadcasting Co., Roberts has an extensive background in data set management, having served as group manager of the MSS User Group in Guide International, Inc.

More information on the seminar is available from Don Murphy at SMM, Crocker Bank Bldg., 1007 Seventh St., Sacramento, Calif. 95814.

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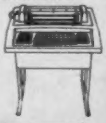

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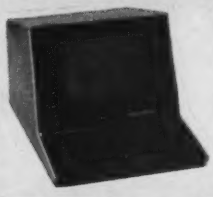

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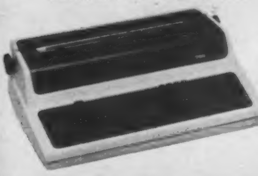

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Facom Reliability Draws Users

Only IBM Led Fujitsu in '79 Australian Sales

By Nancy French
CW Staff

MELBOURNE, Australia — Users here last year bought more systems from Facom Australia Ltd. — Fujitsu Ltd.'s Australian subsidiary — than from any supplier other than IBM, according to a recent local newspaper report. They are buying for several reasons:

- Price/performance.
- Reliability.
- Software (not plug) compatibility.

All Facom systems come bundled. The company offers users software, education, hardware, manuals and maintenance at a better price. In addition, like Japanese cars, most options are standard.

Facom offers a 2,000 line/-min laser printer that prints a range of different fonts and graphics for just slightly more than an ordinary line printer. Three-color terminals are also standard, a sales representative said.

Known for Reliability

But reliability is the factor that everyone here is talking about. Fujitsu builds its systems "from the ground up" using a 100% testing philosophy that includes chips and subassemblies as well as a 30-day test of each full system.

As for software compatibility, the Facom systems allow users to run their IBM applications without conversion under Facom's own operating systems.

The built-in reliability of the systems allows the firm to sell its Facom V-830 minicomputer through distributors that will write applications programs for Australian users.

Market Share Of Vendors By Installed Value

IBM	**37%**
Burroughs	**11%**
Honeywell	**11%**
ICL	**8.9%**
Univac	**8.8%**
Control Data	**7.2%**
NCR	**3.9%**
DEC	**3.8%**
Facom	**3.5%**

Small Business Systems

IBM	**11%**
DEC	**10%**
Wang	**10%**
Datapoint	**8%**
Quantel	**7%**
Honeywell	**7%**
Microdata	**7%**
Hewlett-Packard	**7%**
Nixdorf	**4%**
Data General	**4%**
Burroughs	**3%**
Basic Four	**2%**
ICL	**2%**
All others	**18%**

Figures courtesy of IDC Australia

The above figures show the major vendors' share of the current installed base.

The system is expected to make an appearance in the U.S. sometime next year with applications software for small business users available through Martin Marietta Data Systems, Inc. and written by a British firm.

According to Mike Rydon, the Australian managing director, Fujitsu is testing its ability to run a "service business" — which the computer business is — in the Western world.

"Serving computer users is far different from delivering a product like a television," he pointed out, and it is this type of experience that Fujitsu needs before moving into the U.S.

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The Model 745 allows representatives to access the full capabilities of the host computer with its interactive communication features for reliable, responsive results. With the Model 765, utility auditors can speed up the audit process using the data terminal's editing feature, built-in bubble memory data storage and Data Entry Validation Option capabilities.

Once the data has been collected, these portable data terminals can calculate the various energy parameters, and supply customers with a required hardcopy printout of the results and suggestions for energy-saving improvements. Additional on-site reports can be generated for customers that request recalculated summaries utilizing varied energy rating factors.

Both the Model 745 and the Model 765 offer virtually silent 30 characters-per-second thermal printing, an easy-to-use typewriter-like keyboard, and a built-in acoustic coupler for transmission to the host computer. These, and other features on the Models 745 and 765, can eliminate handling and postage costs as well as time delays incurred with other audit methods, and reduce communications costs and time.

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Interactive TV Pictured as Data Base Access Aid

By Nancy French
CW Staff

MELBOURNE, Australia — Someday data base users may be able to browse through a data base and locate needed information using ordinary TV monitors equipped with a touch-sensitive feature and a joystick instead of formal query languages.

This system was one of several presented at a session on interactive TV at the International Federation for Information Processing's (Ifip) Congress 80 here recently.

The Spatial Data Management System (SDMS), described by Christopher F. Herot of Computer Corp. of America in Cambridge, Mass., allows the user to interact with the data base looking for data with pictorial and color clues much the way one would look for items on a desk, Herot explained.

Herot's prototype system requires three monitors: One to provide a kind of world map through pictures of the data; a second to draw or make notes on the data displayed; and a center monitor, equipped with a joystick to zoom deeper and deeper into the file. The data base is its own data dictionary, he pointed out.

Objects in the system are represented by pictures arranged on a flat data surface which indicate the presence of information or programs.

Zoom In Feature

By twisting the joystick, the user can zoom in for a closer look which the system implements in either of two ways. It can give a more detailed representation of the original picture, such as the weight and dimensions of the pictured Russian ship, or it can execute a program that carries out some activity, such as displaying a document or retrieving a picture from a video disk, he explained. The user need not know the difference.

The system can be used in conjunction with pictures in a personnel data base, Herot said. Data can include pictures and graphs, as well as the typical textual representations of data.

The SDMS allows the user to see large quantities of data on a small screen by partitioning the graphical data space into multiple data surfaces. He can view a data surface at any level of detail. The main display of the SDMS user station functions as a window onto the data surface.

Herot's system permits graphical data space to be partitioned into multiple data surfaces linked together in a network. The user merely moves from one data surface to another by zooming closer and closer to the data and going through a port to the next data surface, he said.

The system runs on a dedicated PDP-11/70 running on a modified version of the Unix operating system. The system has a 1.25M-byte memory, which is used primarily for manipulating the graphical data surfaces and staging them to the display. Data surfaces are stored on a moving head disk as bit arrays known as image planes, he said.

Teleconference in Virtual Space, now under study at the Department of Defense's Advanced Research Projects Agency, is aimed at eliminating many of the limitations of today's teleconferencing technology as well as providing additional features, such as a shared workspace or blackboard that any of the conferees can write on, according to Clinton Kelly, who described a prototype system being built under contract with Decision and Designs, Inc., of McLean, Va.

A virtual space teleconference consists of three or more sites that may teleconference simultaneously with as many other sites as it has conferee surrogates. A surrogate consists of a visual display, a camera pointing the same way as the display, a microphone and a speaker sup-

(Continued on Page 30)

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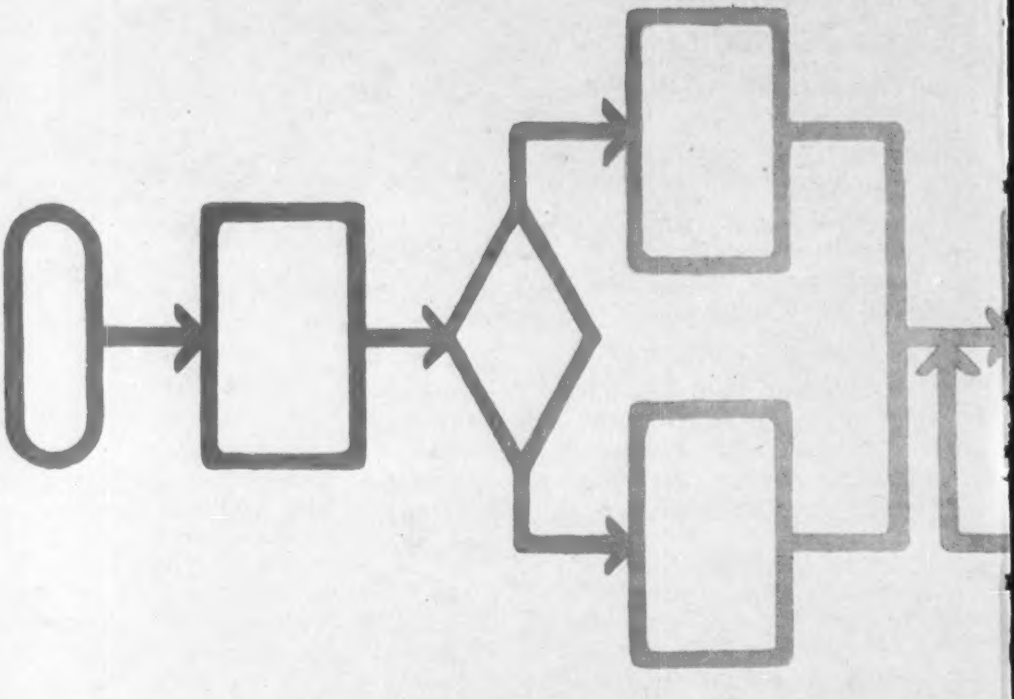

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Cobol to Stay on Top, Experts Predict

MELBOURNE, Australia – A variant of today's Cobol will still be the dominant language in industry and commerce in 1985. Algol and Pascal will have that stature in the university area, according to a recent survey of college professors and industry practitioners.

Compiled by Dr. H. Maurer of the Institute for Information Processing at the Technical University of Graz in Austria, the survey gives a quick snapshot of current thinking on the quality of programming and programmer training. Of 204 responses, 98 agreed that more programmers would be needed throughout the '80s, and 72 thought more probably were needed.

One hundred and sixty-four agreed a computer science degree does not make one qualified as a programmer, but 132 agreed programmers should have a university degree.

However, 144 respondents believed programmers could be trained below the university level, while 113 suggested training at the high school level.

The results were presented here at the recent International Federation for Information Processings's (Ifip) Congress 80.

Panel Disagrees on Ways To Prepare Programmers

By Nancy French
CW Staff

MELBOURNE, Australia – More programmers will be needed in the '80s, a panel of prominent computer scientists here agreed recently – but they did not agree on what kinds of people should be recruited, how they should be prepared and trained or what they will be doing.

The problem is a multifaceted educational one, panel chairman Dr. Heinz Zemanekl, an IBM fellow in Vienna, Austria, said. The young and the old must be trained to work with computers, and they must be prepared for change, he said.

A good university education would help programmers adapt to the change that will be inevitable in their lifetimes, while those who were merely trained may not have developed their internal resources in a way to permit this.

Maintenance – like the poor – apparently will always be with us. For that work, according to Dr. Herbert R.J. Grosch, a consultant and former president of the Association for Computing Machinery, people could be recruited off the street and given a quick training course.

For the more creative work, however, university graduates with a good theoretical foundation are needed, the panel seemed to agree.

"Programming is no different from any other intellectual activity," Prof. W. Turski of the Warsaw Institute of Informatics said. "To do it well, you have to learn it," he said. However, he decried work like software maintenance as "unfit for human beings. Some jobs should go unfilled," he said.

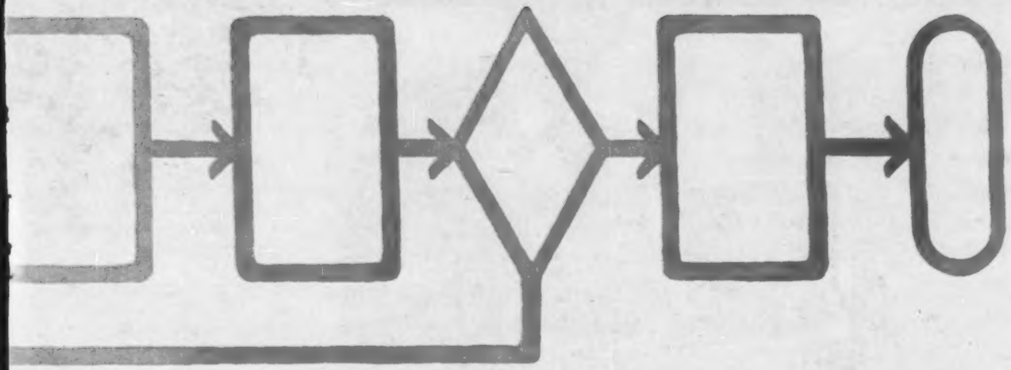
Although several members of the audience posed questions concerning the use of packaged software and other technical solutions – such as report generators and query languages to reduce the amount of Cobol coding needed to perform certain types of tasks – only H. Remus of IBM's Teresa Laboratory addressed that idea.

Simple Programming

Computer programming should be made easy enough for end users to do without any special training. It takes eight months for a computer science graduate to become productive – six to eight weeks in the classroom and the rest from on-the-job training.

As part of the solution, Re-

(Continued on Page 30)



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Panel Disagrees on Future Programming Scene

(Continued from Page 29)

mus argued that "interest in programming should start at the high school level." He also called for reuse of programs and program parts.

As for the contribution of packages, Grosch said it will be "20 years before we're able to select good packaged software" in sufficient quantity to reduce the need for programmers. Many packages are poor — designed to make money rather than provide real solutions, he indicated after the session.

Grosch also decried today's overspecializa'ion. There are some people, he said, who are specializing in a small part of a vendor's operating system. "What happens to a person when the vendor throws out that operating sytem?"

His view of some programming work in the '80s was that it would be done by a bunch of "do-it-yourself" programmers, each doing his own tasks on his own microcomputer. However, this type of approach would require an overriding staff function to impose a healthy protective blanket on things.

Without this, things could go seriously downhill. When we need them to become professionals, they will remain amateurs, Grosch remarked.

H. Bauer of the University of Munich argued for greater care in the specification of program solutions — a formalized style of native languages. Turski agreed that a clear statement of the problem provides its own solution.

The failure of the universities in preparing computer science students to be productive programmers also came under fire.

Some members of the audience, however, argued that a university was a place to teach people to think. "We can't produce people who know Cobol because you can't think in Cobol," a professor from Cornell University quipped.

Several panelists agreed that industry should be willing to play its part in preparing people to be productive.

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Monitor Tool Within View

(Continued from Page 28)

plying audio from the same site from which the display provides the image.

This system is also being designed for "generals and six-year olds" whose common characteristic is being too impatient to learn how to use complex equipment, Kelly remarked.

According to Kelly, the system produces a new picture at the rate of 7.5 frames per second — which, when integrated over time, produces a "pretty good image."

In addition, the surrogates enable the teleconferee to see when his conferees are looking at one another or directly at him.

Future goals include being able to allow note passing, asides and a larger workspace or blackboard, Kelly said.

At present, the system transmits over ordinary telephone lines at 9,600 bit/sec and is being designed for use by military personnel in times of crisis.

Another use of interactive TV, described by Andrew Lippman of MIT, illustrated how an ordinary home TV screen with optical video disks can be used to create an "experiential map." Using Aspen, Colo., as the locale, the speaker demonstrated how a user of the system could experience what it would be like to drive through the town and where he would end up if he turned right or left at any given landmark. Films were stored on video disk, and a touch-sensitive panel allowed the user to select turns.

With two disks, the second disk could run ahead to the next intersection, for example, and prepare the next sequences. This cuts the search time to zero, Lippman said.

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Hospital Takes Long Road to 'Utopian' System

By Bruce Hoard
CW Staff

NEW YORK — Building a computer system for a hospital is a long, arduous task that requires painstaking communications among all concerned parties, Carl Fargiano, vice-president of management information services (MIS) at Norwalk Hospital, told attendees at a recent conference here.

The Health Services Data System at the Connecticut hospital was started in 1971 and is still not entirely implemented. It is composed of three subsets: the clinical management system, patient management system and financial management system.

Prior to 1971, DP at the 427-bed facility fell under the control of the finance department and was regarded as an unwanted stepchild by hospital management, Fargiano said.

New Regime

However, after management was shuffled in 1971, a new group, less antipathetic to computers, came to power. "Our task then was to find out what, if any, computer applications we could use for the hospital," Fargiano commented.

He, along with 14 other DPers, started an ambitious project that would eventually include representatives from every area of the hospital.

The first step was the formation of five study committees that would determine computer needs in specialty areas of the hospital. Directors, nurses, hospital management, MIS people and trustees were all included.

The study committees met regularly once or twice a month and reported progress to the steering committee, composed of the hospital president and trustees. "The steering committee told us to build a utopian system and not pay any attention to the costs," Fargiano said.

The five study committees represented administrative systems, medical monitoring and instrumentation, diagnostic systems, data base confidentiality and clinical data base. Many people were on more than one committee to ensure good communications among them.

First Application

After two years of working and planning, the scope of the system's first major subset, the patient management system, was defined and approved by the steering committee. The hospital then hired the consulting firm of Arthur Andersen & Co. to do an eight-month study, which culminated in a 700-page report.

At that point, MIS got the go-ahead to hire a manager in hospital administration and a project leader to firm up plans. By the end of 1977, two more reports were compiled and the search for a vendor was on.

"We came down to four vendors," Fargiano said. "We did not start the search earlier because we didn't want the committees to be influenced by what was on the market."

After deliberating on the pros and cons of various systems for a month and a half, the hospital selected IBM. With a 370/148 already in place, it seemed logical to build a system around it, Fargiano recalled.

However, the $5.5 million IBM wanted to put the system in place was prohibitive in the eyes of the steering committee. So Fargiano and Arthur Andersen went back to the drawing board.

Three-Step Plan

After nine months, they came up with a "modularized, phased," three-step plan toward computerization. The first step would affect between 50 and 100 people, the second, another 150 and the last, the rest of the hospital's 1,600 employees.

Fargiano's group started programming in 1978, and the initial, basic system was completed in December 1979. That was phase "A." Phase "B," the result reporting system, is nearly complete. The first terminal is slated to be installed at a nursing station Nov. 15.

After that, phase "C" will consist of placing terminals at all nursing stations at the hospital over the next 2 1/2 years, Fargiano said.

The clinical management system — the second major component of the overall system — consists of several minicomputers reporting from disparate areas, such as radiology and nuclear medicine, to the 370/148 and newly installed 4341.

The third and final major component is the financial management system. "It is a by-product of the patient management system," Fargiano explained, adding that it takes over after tests and other services are rendered.

To date is "utopian system" has cost $800,000 for hardware and $1.2 million for software. Fargiano's staff has saved on software by writing many of its programs in-house, he claimed.

What was previously a five-day-a-week, two-shift operation has now been converted to a seven-day, 24-hour shop.

Although he admitted to making several mistakes along the way such as waiting too long before involving private doctors in the plan, Fargiano expressed overall satisfaction with progress to date.

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Panel Looks at Office Automation, DP Linkup

By a CW Staff Writer

NEW YORK – "DP is very structured and has a lot of rigidity," Gerry Cullen, vice-president of marketing at Datapoint Corp., stressed.

But now DP is moving out of the central part of the company, gaining new users that are not as rigid, he continued. The fact that a record is a fixed length is meaningless for a growing number of new users within the organization.

Cullen and other system suppliers expressed their views on what the integration of office automation and DP means for vendors at a recent conference session here.

Right now Datapoint is adding office functions to its standard DP systems. Any system should be capable of doing anything, Cullen asserted. "The day of the single-purpose machine is over."

Cullen called Datapoint's present activities a preparation for the next phase of its development that will extend the use of terminals to the shop floor.

However, the proliferation of terminals to new nooks and crannies of the organization is not a guarantee of productivity, the panelists agreed.

"Automation probably won't increase productivity in the office in the near-term future," offered Duncan B. Sutherland Jr., an office automation consultant with Wang Laboratories, Inc.

"People have to want to manipulate the system," he emphasized. "The user organization must have the proper attitude [toward automation]. It isn't a magic hoe."

Moreover, "turnkey applications cannot be applied to the office, because the office is not as structured as the DP environment," stressed Jack Barry, manager of information processing systems in the Strategic Business Unit of Xerox Corp.

Currently, word processing applications are only nibbling at 7% of the expenditures for the office, according to Jack Gilmore, corporate manager for Office Information Systems at Digital Equipment Corp.

The automated office system will have to perform word processing, communications, administrative and DP functions. The "knowledge worker" or professional will use the full range of these functions, whereas executives and other workers will use a narrower scope of capabilities, he maintained.

In the near term, office automation systems will handle electronic mail, conferencing, scheduling, hard-copy mail scanning and reminder services. By the late 1980s these systems will build in voice security, voice recognition for dictation, graphics and broadband transmission, resulting in a broad reduction in paper use, he predicted.

WDP Schedules Data Base Talk

NEW YORK – "Data Base – Structured Techniques for Design, Performance and Management" is the title of a text and seminar by Shaku Atre, and both are available through Women in Data Processing, Inc. (WDP).

The full-day seminar, slated to take place here Nov. 1, encompasses the areas of information sources, environment, independence, data base administration, data dictionary, design models, storage, access and implementation. Atre's recently published book will provide the basis for her lecture, and course participants will be able to purchase the work at a 40% discount, WDP said.

Cost of the course is $105 for non-WDP members, $95 for members and $55 for full-time students. The Atre book will be offered for $16.95. Further details, including future dates for the seminar, can be obtained from WDP at 310 Madison Ave., New York, N.Y. 10017.

Courses Slated On Security

PALO ALTO, Calif. – Winter 1981 course offerings have been announced by Hellman Associates, Inc. "Cryptography and Data Security" will be held here Feb. 2-4 and in Washington, D.C. March 23-25. The program will be conducted by Prof. Martin E. Hellman, as will the "Cryptography and Data Security Executive Summary," a one-day version of the above. The summaries will take place in Los Angeles Jan. 19, in Chicago March 19 and in Boston March 20.

The third course in the series is "Error Correcting and Detecting Codes," taught by Prof. E.J. Weldon Jr. This will be presented Jan. 19-21 in Palo Alto and March 23-25 in Boston.

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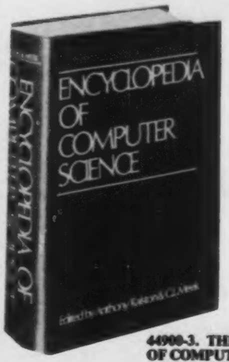
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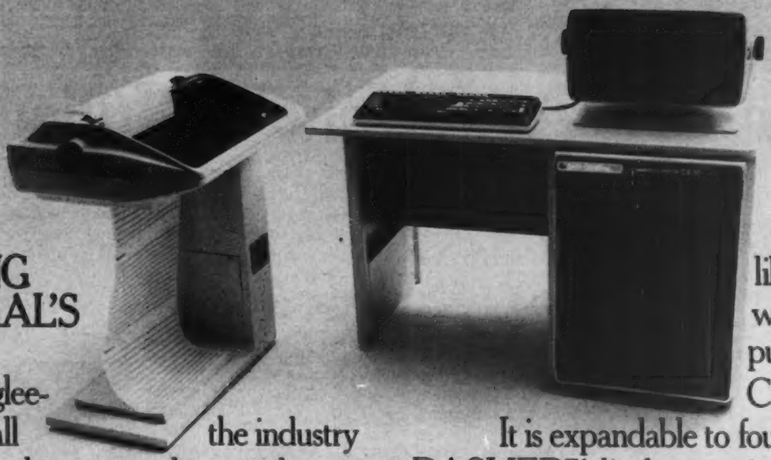

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CW-10-27-80

Mass. Supreme Court Upholds Ruling on UPC

By Deborah Wise
CW Staff

BOSTON — The Supreme Judicial Court of Massachusetts has upheld a ruling that the Universal Product Code (UPC) cannot be used as the sole means of pricing consumer goods. As a result, each item must be clearly marked with its individual price.

Purity Supreme, a supermarket chain here that used a UPC checkout method, challenged a Massachusetts Attorney General's regulation that it is unfair and deceptive to "fail to affix to any goods offered for sale to the public the price at which the goods are to be sold."

Purity lost its case and will now have to price, as well as bar code, the items in nine of its 41 stores that used UPC. Before the ruling, Purity had provided its customers with pencils to write the prices in themsleves, but these were not often used.

"As far as I am concerned, it was 100% accurate," Thomas Manning, manager of systems and programming for Purity, said of the UPC system. He maintained the store carried out a complete inventory verification check once a month and that no unfairness or deception occurred.

"It is a plus we won't be able to avail ourselves of anymore," Leo Kahn, president of Purity, said. "When we installed the UPC systems we knew of the Attorney General's regulation and we took it to court and lost. We have gone as far as we are going to go."

The savings gained by not having to mark each item cannot be realized though the POS terminals. The terminals, however, will be able to handle inventory control functions and checkout.

Purity has an IBM 370/138 mainframe with 1M byte of main memory, and in the stores that were using UPC, it had National Semiconductor Corp., Sweda International, IBM and Data Terminal Systems terminals.

Other states have now followed Massachusetts by requiring that every consumer item be clearly marked since the Attorney General's regulation was upheld.

However, in trying to protect the consumer from incorrect pricing, the regulation defeats the cost-cutting premise behind UPC. The court maintained that "some additional cost of item marking may be reflected in increased prices to the consumer. This extra cost of the dual system does not support Purity's claim of unreasonableness."

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Nov. 13-15, Chicago — **National Software Protection Conference.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 14, Dallas — **How to Achieve Manufacturing Control With Software Packages.** Contact: K. Faria, Software International, Elm Sq., Andover, Mass. 01810. Also being held Nov. 25 in Chicago.

Nov. 18-20, Kansas City — **Planning for Computer Security.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20014.

Nov. 18-19, Chicago — **Advanced Systems User Conference.** Contact: Lee Mulder, Advanced Systems, Inc., 2340 S. Arlington Heights Road., Arlington Heights, Ill. 60005.

Nov. 19-21, Phoenix — **Simulation Modeling & Analysis.** Institute for Professional Education, Inc., Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 19-21, Atlanta — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 19-21, Washington, D.C. — **Fiber-Optic Communications Systems.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 20, London — **FPS Introductory Overview.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 20, Chicago — **Software Maintenance Seminar.** Contact: Shetal Enterprises, Inc., 1787 B W. Touhy, Chicago, Ill. 60626.

Nov. 20, New York — **Financial Decisions: Choosing a Financial Decision Support System.** Contact: Real Decisions Corp., 123 High Ridge Road, Stamford, Conn. 09605.

Nov. 20, London — **APL* Plus Ltd. Introductory Overview.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 20-21, Middlebury, Conn. — **Software Reliability Seminar.** Contact: Computing Trends, Inc., 6925 56 Ave. S., Seattle, Wash. 98118.

Nov. 20-21, San Diego — **Educational Computing in the '80s.** Contact: Ron Langley, Computer Center, California State University, Long Beach, Calif. 90840.

Nov. 20-21, Washington, D.C. — **Computer-Aided Graphics.** Contact: Data Processing Management Association Education Foundation, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Nov. 20-23, Boston — **Personal & Business Computer Shows.** Contact: National Computer Shows, Inc., P.O. Box 678, Brookline Village, Mass. 02147.

Call for Papers

INTERNATIONAL FIBER OPTICS & COMMUNICATIONS EXPOSITION, Boston, March 24-26, 1981.

Papers are being invited on any of the following subjects: data communications; computers; entrance links; automotive; power/energy; local data networks; nondestructive testing; light transmission; medical; imaging; graded index optics; CATV; variable message signs; MATV; sensors; aircraft; industrial control; machine tools; transportation; robotics; printers; security systems; office of the future; word processing; copiers.

Authors are requested to submit a 200-abstract on potential papers by Nov. 1 to Ellen M. Bond, Director, Expositions & Publications, Information Gatekeepers, Inc., 167 Corey Road, Brookline, Mass. 02146.

INTERNATIONAL CONGRESS ON MEDICAL INFORMATICS, Strasbourg, France, April 27-29, 1981.

Some of the topics of interest for this conference are hospital information systems; data bases and medical records; microcomputers; technology trends; medical informatics teaching; analog data acquisition and processing and long-term data storage.

Authors are requested to forward the original version, along with four copies of their abstract by Dec. 15. Abstracts should be one page only, camera-ready, 21 cm wide by 29.7 cm high with 2 cm margins.

The title of the work must be in capital letters, followed by the author's name, underlined.

Materials should be mailed to the congress secretariat at WAMI, 74 Rue de la Colonie, 75013 Paris, France.

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EDITORIAL

FAA Must Act Now

If the Professional Air Traffic Controllers Organization (Patco) stages an illegal strike when its contract runs out next March 15, the Federal Aviation Administration (FAA) will have only itself to blame.

In the face of growing FAA suspicion that just such a strike will occur [CW, Oct. 20], the agency continues to spout its party line that the problems repeatedly cited by controllers simply do not exist. Those reported problems include understaffing, undercompensation, antiquated computer equipment and a training program that strains the limitations of journeymen controllers.

On the matter of allegedly outdated computer equipment connected to controllers' radarscopes, the FAA steadfastly insists the equipment's reliability has improved over the last seven years.

Whether statistics can show such improvement or not, a rundown of recent outages around the country — as reported in the general press — certainly illustrates the need to reevaluate a system on which air travelers' lives and safety depend.

On Sept. 5, according to the *Minneapolis Tribune,* a computer outage at the Minneapolis Air Route Traffic Control Center (ARTCC) in Farmington, Minn., was exacerbated by the subsequent failure of the backup system.

On Sept. 23, problems at both southern California's Palmdale ARTCC and Georgia's Hampton ARTCC caused delays in those locations. The California outage was another example of the main and backup systems failing simultaneously. Those stories appeared in the *Los Angeles Times* and *The Atlanta Constitution,* respectively.

Sept. 24 brought similar delays at Boston's Logan International Airport, stemming from a computer outage at the ARTCC in Nashua, N.H. While no near mid-air collisions were reported, one controller confused the identities of three of his radar blips, so he did not know which planes they represented, according to the Manchester, N.H., *Union Leader.*

Oct. 3 again brought double trouble, when failures at Palmdale, Calif., and Miami's ARTCC caused delays, reported by the *L.A. Times* and *The Miami Hearald,* respectively. In the case of the Palmdale failure, which again involved both main and backup systems, Vice-President Walter F. Mondale reportedly took off from L.A. International Airport nine minutes before computer service was restored.

In every case cited above, FAA officials were quoted as saying the outage posed no danger to air safety because of the backup systems. In three cases, however, the backup systems also failed, increasing the chance of controller confusion in converting to a "manual" system and the possibility of a mid-air collision.

And while the FAA worries that the flying public will suffer in the case of a strike next spring, it would be far better to endure a temporary inconvenience than a permanent disaster. The FAA should act now to avert both inconvenience *and* disaster — by acceding to controllers' demands for state-of-the-art equipment *before* they decide to strike.

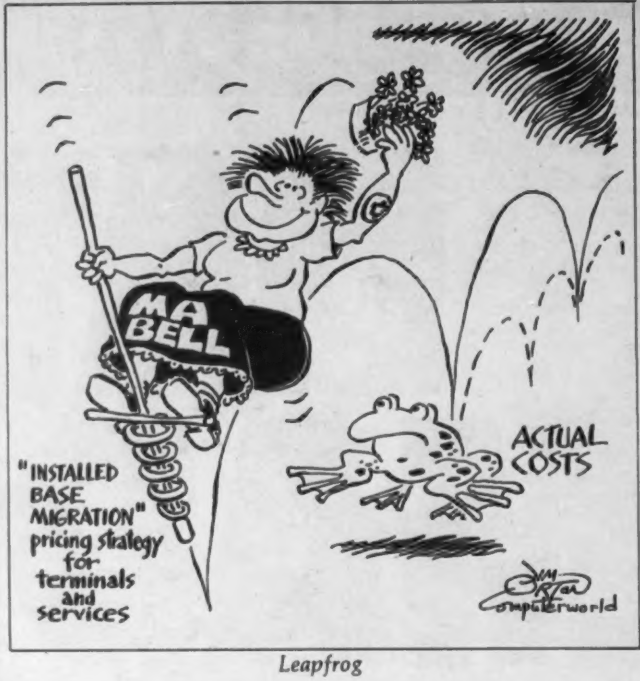
DATA PAST

Five Years Ago
Nov. 5, 1975

CAMBRIDGE, Mass. — There might be serious errors in official computer predictions used as a basis for licensing large-scale nuclear power plants, Carl J. Hocevar, an engineer with the Union of Concerned Scientists, said here. Tests performed at Aerojet Nuclear Co.'s Idaho National Engineering Laboratory raised new doubts about the safety of reactors, Hocevar said.

Eight Years Ago
Nov. 1, 1972

WASHINGTON, D.C. — The specialized needs of data communications users might require the establishment of "value-added" networks, according to Clay T. Whitehead, director of the Office of Telecommunications Policy. Whitehead described the networks for an audience at the first International Conference on Computer Communication.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LETTERS

Conceptual Fog

Computerworld's report of Robert M. Price's keynote address to the annual conference of the Society for Management Information Systems ["Productivity Linked to 'Knowledge Nuggets,' " CW, Sept. 29] did not deserve Page 1 treatment. And assuming that the report was accurate and essentially complete, I question whether Price's comments deserved any mention at all.

Certainly, the productivity issue is important and timely. And certainly, the design of management information systems (MIS) has a direct bearing on this issue. But how did Price's comments advance our understanding of the relationship between productivity and MIS? If anything, he has muddied the waters by introducing needless neologisms and fuzzy distinctions.

Although Price is president of a corporation that purports to control data, he is evidently confused about the distinction between data and information. Whether these terms are used in ordinary or technical language, they are not considered synonymous.

Data that is endowed with intelligible form is information. In ordinary language, the term "information" refers to data that has been organized according to some interpretive scheme. In technical language, "information" is understood as a function of message probability. Thus, the statement that American business churns out "220 billion pages of information every working day" is simply false.

Clear distinctions among the terms "data," "information" and "knowledge" are critical for the topic Price wanted to discuss. But by failing to conform to the conventions of standard usage, Price leads us into a conceptual fog with statements like "(a computer-aided management system) correlates and synthesizes specific data . . . it generates knowledge, not information." We are lost in a thicket of new critters like "knowledge nuggets" and "knowledge-assistance systems." Are these terms anything more than examples of the gobbledygook that is rife in the computer industry?

By drawing spurious distinctions and through unwarranted deviations from ordinary word usage, Price contrives a new and improved system that will assist management knowledge by producing nuggets of it. But we are not given even one example of a "knowledge nugget," and we begin to suspect that it is nothing more than a good, old-fashioned piece of information. Is the whole thrust of Price's address simply that all the data that glitters is not gold?

Joseph K. Corrado
Seattle, Wash.

To Pay or Not to Pay

I read with interest the article by Mark Robinett, "Before You Pick Up and Move" [CW, Sept. 22]. I must, however, take issue with his statement that "client companies will pay fees to reliable (employment) agencies, and if they do not think a particular agency is worth paying, neither should you."

I would simply like to point out that there are some companies and government agencies that will not pay a service fee. This is a matter of company policy, often with regard to entry-level positions, and has nothing whatsoever to do with the reliability of the agency.

Also, an agency might be able to negotiate a better salary than the applicant could get for himself, in which case he should let the agency work in his behalf even if he does have to pay his own fee. This is particularly true with recent college graduates who have little or no work experience.

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SOFTLINE/Werner L. Frank

Will the Real Application Generator Stand Up?

"Application generator" is one of the more recent buzzwords to make the rounds in data processing circles. Is this term a modern-day version of the older concepts of automatic programming, implicitly programmed systems or program generator? Or is it another cut at a nonprocedural language or perhaps an attempt to achieve the ultimate higher order language in the form of a report writer, user query system or parameter-driven program?

One of the earlier uses of the term appeared in the book *Data Processing in 1980-1985* (John Wiley and Sons, 1976) where the application generator is described in terms of desired objectives in enhancing the productivity of application development by:

(1) Minimizing the percent of total software in a new application that is new software.

(2) Extending the life-cycle time of a line of code.

(3) Permitting new software to be reusable in other development.

(4) Reducing skill-level requirements of implementations.

(5) Significantly increasing productivity of implementations and quality of resulting products.

(6) Permitting more direct and unambiguous statement or design of problems to be solved.

(7) Eliminating variability in system design by different individuals.

Perhaps the following can serve as a definition of the application generator as presented in the aforementioned book: A tool for implementing an application via user-terminal interaction, in a dialogue setting, where selection choices and responses to posed questions lead to the automatic tying together of hierarchically organized sets of building blocks into executable programs for solving a specific problem.

> *'We have at least three views of what an application generator is and does. As in many areas of data processing, words by themselves do not necessarily tell the story nor are they consistently used. The term "application generator" is another one of those buzzwords that floats around and has not settled.'*

Two New Concepts

IBM has recently introduced two new concepts in connection with providing more implementation capability for the computer user: Application Enabling and Data Systems. Both of these terms advance the notion of application generator.

Application Enabling offers three choices for enhancing new application development. One is the purchase or lease of off-the-shelf packaged software. The second includes certain licensed software designed for non-DP personnel to assist in problem solving — as, for example, query systems, report writers and special-purpose financial planning tools. The key operating theme for this software is an English-like language that purports to make easy the exercise of a functional program by users who have no DP knowledge.

The third member of this enabling capacity is the application generator. IBM describes this software productivity enhancer as a "simple fill-in-the-blank technique to specify preprogrammed functions, instead of writing in a procedural language."

Two products are specifically identified to illustrate the application generator: the Application Development Facility (ADF) and the Development Management System (DMS). The former is used in conjunction with building applications for operation with IMS and the latter is for use in construction of programs in CICS or 8100 information system environments.

The Data Systems concept encompasses the same objectives as Application Enabling, but is limited to the construction of programs that are heavily dependent upon data base and data communications (DB/DC). The overall environment starts with a data dictionary focal point, adds the DL/1 or IMS/DB data base, is inclusive of CICS or IMS/DC for data communications and provides a "data delivery" capacity for constructing an application solution. Again, as in the enabling viewpoint, the ADF and DMS program products are classified as application generators that are part of the data delivery portion of Data Systems.

In use of the term "application generator" within both Application Ena-

(Continued on Page 46)

HUMAN CONNECTION Jack Stone

What Makes a DPer A Real Professional?

Are you *sure* you know what a DP "professional" is?

I thought I did, but I learned recently that my understanding of DP professionalism was superficial and confused. Since then, I think — or at least I hope — I have sorted things out. Because I suspect many readers may have problems in this area, I thought it worthy to discuss here.

It all started several weeks ago, when I was invited to a gathering of a small group of DPers who were planning the annual meeting of their professional association. One of the program modules that was discussed dealt with the development of professional skills, and the feeling of the group was that some stiff injections of advanced technical methods during seminar times would help build the professionalism of the members.

I was bothered by this reasoning, but was not really sure why at the time. At first I thought the knowledge of advanced techniques should enhance the professionalism of DPers — but does it really? Does being current with up-to-the-minute technology make a DPer a professional? That doesn't seem right — and, of course, it isn't: knowledge of facts and figures *alone* doesn't make a person professional.

And I have the same kind of problem with the whole argument about certifying the DPer as a professional through a pass/fail examination. The cold reality is that there is room for an awful lot of professionalism in our industry that absolutely does not relate to the knowledge of advanced technology. As one example close to home, my 17-year-old son, Joe, owns and operates a data processing service bureau using a fairly archaic micro and a whiz printer (and a little help from papa), and his customers tell me he is the most professional in the area.

I checked Webster's *New World Dictionary* for some definitions and, curiously, found no reference to knowledge per se, but rather skills:

"Professional — noun . . . a person who engages in some art, sport, etc., for money, especially for his livelihood, rather than as a hobby . . . a person who does something with great skill."

"Amateur — noun . . . a person who engages in some art, sport, etc. for the pleasure of it rather than for money."

I can't accept these definitions as completely applicable to our people because I also don't believe that technical skills are enough to make a DPer a professional. Surely we all know analysts and programmers who are red hot with a Hipo diagram or a programming terminal but, for example, won't relate to users or prepare documentation or help teammates; they are technically skilled, but don't deserve the label "professional."

And I thought back on how many DPers I have met in recent years (as I'm sure you have, too) who expressed, quite openly, this kind of opinion on the data processing business: "This stuff is great! Running these programs and machines is just wonderful! It's not a vocation — it's an avocation. And

(Continued on Page 42)

THE TAYLOR REPORT/Alan Taylor

Printer Studies Point Up Additional Noise Factors

Printer and terminal rooms have been a noise problem for users for years — and often the trouble seems to be getting worse rather than better. Two reasons for this noise pollution are found in some surprising results from studies prompted by earlier Taylor Reports on the subject — although by hindsight the reasons may now appear obvious to anyone who owns a stereo set and knows what woofers and tweeters are made of.

The fact is that one secret guilty party is the paper, which on its way out and in has been acting as a broadcast speaker, amplifying and spreading the already considerable noise of the printing. Stereo speakers actually are paper that has been hung and allowed to vibrate, and the same situation is set up by the various paper transports.

Of course, as with speakers, distance has made a major impact on the volume of noise emitted by paper; the nearer the printing action, the noisier the broadcast operation. But the broadcast noise persists, quite audibly, to more than 20 inches on each side of the printing mechanism.

The persistence of this broadcast noise makes the appearance of the standard paper transport designs misleading. In the normal design, the actual area around the printing is more or less shielded, so the noisiest part of the paper is shielded with it. Here the broadcast simply adds to the amount of noise involved in the printing operation.

The serious part is the unshielded noise that occurs at the unshielded areas of the paper path some 20 inches on either side of the operation. Very frequently, the paper passes through the surrounding box less than 10 inches after the printing — and then really is acting as a speaker.

Users should watch the paper paths and check them out for shielding until the paper has had time to stop vibrating.

Another item users have to watch is sex-related. It seems that terminals sound noisier to women than to men. And as printing speeds increase, the difference is becoming greater and greater.

The higher the printing speed and the number of cycles per second of effective noise, the more noise occurs in the 15,000 cycle/sec frequency and above. In this area, men are normally deaf, while women hear a shrieking sound. Matrix printing is prone particularly to producing high-frequency noise. Tests of noise acceptability should take the sex factor into account.

When choosing printers and terminals, users can and should look for these two factors in addition to the normal noise abatement requirements such as close control of all openings and use of quiet fans.

(The tests for these studies were performed by Smart Products, Inc., 52 Irving St., Framingham, Mass. 01701.)

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LETTERS

Not Always True

In reference to Bob Brown's letter [CW, Sept. 29] regarding Al Volpe's "Worst Case" [CW, Sept. 1], his statement that "the only possible penalty [for cascaded IFs] is a few microseconds of machine time" is true only if the cascaded IFs are not enclosed in a heavily used loop.

As an example, I witnessed the cannibalization of a once beautifully operating file search program, which was ruined by the inclusion of the "trickle-IF." The programmer had added a "what-if" test for a selected set of 120 contract numbers against the master file. As there were few records out of the hundreds of thousands that would match any element in the trickle-IF, most records failed *all* of the tests.

Without the trickle-IF, the program efficiently searched the master file in about 10 minutes (I/O bound). With the inclusion of the 120-element trickle-IF, the same program was still running three hours later (processor bound)!

Two fixes were possible, one in the Procedure Division only and one which shared the work load with the Data Division. The example below shows the latter as it is the more general. Both brought the run-times back below 15 minutes.

With the Data Division approach, the list of possible field values was coded as a table of search KEYs in Bob Brown's "easy-to-maintain" alphabetic order, as in:

```
01 SEARCH-TABLE.
   03 FILLER PIC X(20) VA "nnnKEY1      ".
   03 FILLER PIC X(20) VA "nnnKEY2      ".
      etc.
01 ACTUAL-SEARCH-TABLE REDEFINES SEARCH-TABLE.
   03 TABLE-ELEMENT    OCCURS xx TIMES.
      05 CASE-CODE     PIC 999.
      05 KEY-ELEMENT   PIC X(17).
01 TABLE-SIZE          PIC 999 VA xx.
```

Within the Procedure Division, more general code was generated, as in:

```
    PERFORM BINARY-SEARCH-AGAINST-KEY-ELEMENT.
    GO TO specific-handler-label-list
        DEPENDING ON CASE-CODE(SEARCH-RESULT).
    PERFORM ERROR-ROUTINE.
COMMON-RETURN-POINT.
```

The complexity of the search and the optimization of any reordering to improve the "heuristic" efficiency has been relegated to the Data Division. The alphabetization to improve maintenance also permits use of the tried-and-true binary search as opposed to a linear SEARCH. The simplicity of performance and expansion capability have been retained in the Procedure Division.

New elements can be added to the SEARCH-TABLE so long as they preserve the binary searchable property of the table. The index of *where* the key was found is not as important as the value of the CASE-CODE it carries with it. This permits synonyms to be added to the table and still reach the same procedural code. It also permits new KEYs with new CASE-CODEs as long as they do not select a previously existing index.

As for the "none-of-the-above" problem, the GOTO . . . DEPENDING ON construct is defined to "fall out the bottom" if the index value does not correspond to a valid element in the label-list.

For the sake of a GOTO-less program structure, we are at a loss. The PERFORM paragraph-thru-paragraph-list DEPENDING ON construct does not exist. It would have provided automatic return. Reality of the present dialect(s) requires the use of a GOTO COMMON-RETURN-POINT explicitly in each of the case-specific routines.

From a maintenance standpoint, sharing complex path selection with the Data Division not only makes the program easier to understand, it also makes simple any alteration to the structure of the program.

Larry McQuown

Santa Clara, Calif.

Unfortunate Condemnation

Concerning the letter "Not for Money" [CW, Oct. 6], it is unfortunate that Ken Mitchell resorted to condemning the computer consultant industry based on a single six-month experience. Consideration of the vast experience in the industry makes the remarks seem unprofessional.

Assignments are not always readily tailored to an individual's talents and expertise. Also, the ultimate project can not always be made a reality.

I do agree that money should be secondary to things such as company operating and personnel policies.

Currently a consultant with a highly reputable firm, I have been fortunate to have always had 110% support from management as well as from fellow members of the technical staff. This support is truly welcome when difficulties arise with client management or when technical problems bog you down to the point of lengthy overtime periods.

It is my feeling that consultant firms should be separated from the so-called "body shop," where individuals are sent out primarily to keep the profits column healthy. This is contradictory to the true main concern: to provide the client with what it is paying for, quality service.

The best and simplest advice to all potential clients is to be aware.

Fred Eng

Kendall Park, N.J.

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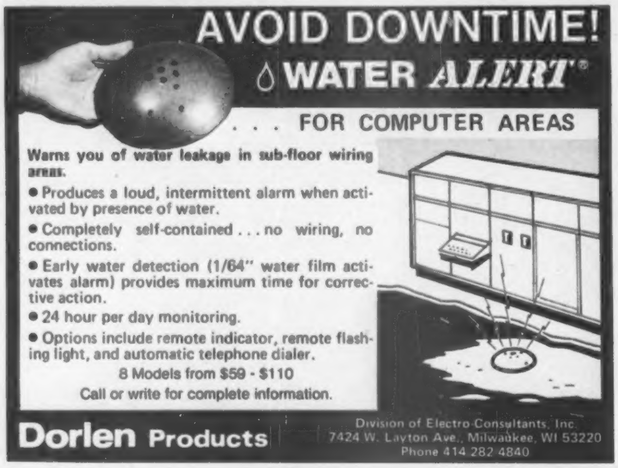

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What Makes DPer a Pro?

(Continued from Page 41)

can you believe this? I'm even getting a great salary for all of my fun and games!" Based on Webster's viewpoint, I would have to conclude that such people are paid amateurs.

My point is this: technical knowledge and skills *appropriate to the data processing job* are necessary *but not sufficient* conditions for professionalism. There are other mandatory conditions. DP professionals do the following:

- Search out and apply new tools, techniques and methods to improve the quality of their work and the efficiency with which it is accomplished.
- Tune and retune their own operating processes to optimize their performance.
- Understand, prepare and implement their own training and education plans to build *all* the knowledge and skills required for their job.
- Direct all their efforts toward the serious goal of supplying effective business systems to end users, not to the goal of fooling around with hardware and software as hobbyists do.

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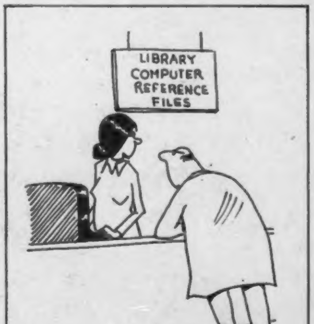

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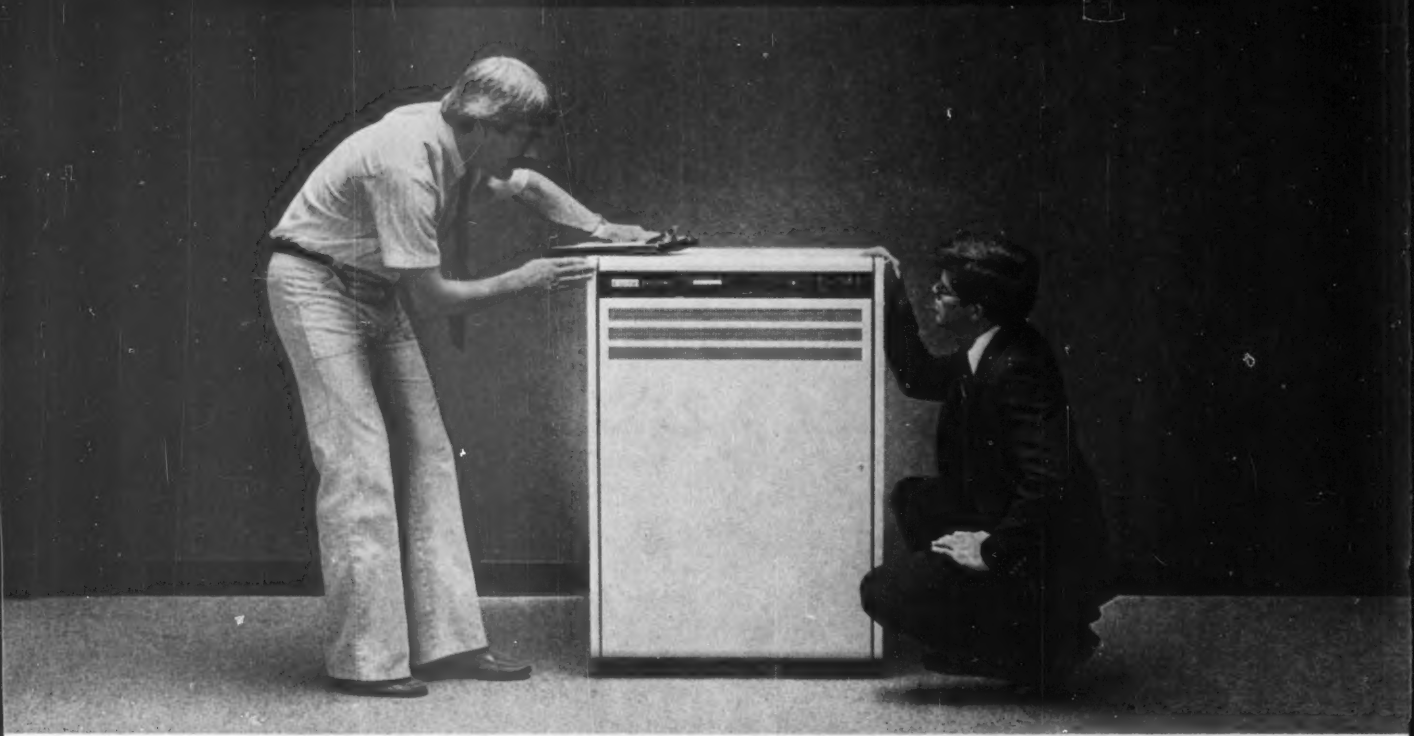

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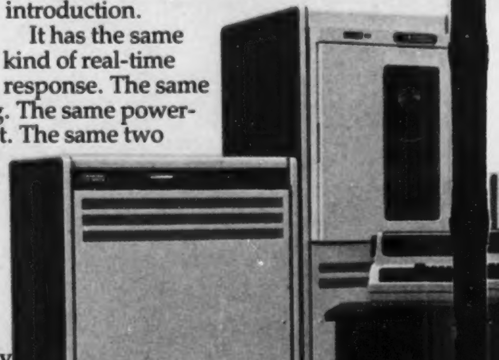

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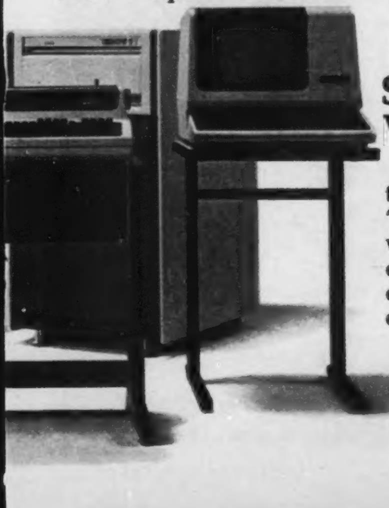

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Sexual Inequality?

Black Data Processing Associates is against racial inequality [CW, Oct. 6], but doesn't seem to be against sexual inequality. The newly elected national president, vice-president and treasurer are men. The two secretaries are — of course — women.

Sherwin E. Pakin
Chicago, Ill.

Advice Rethought

David A. Higgins should rethink his advice in connection with the example of "structured" pseudocode [Reader Commentary, CW, Sept. 22]: ". . . the End-of-File condition would have to be set False in the File-Begin paragraph . . ."

Would it? What if the file were empty? If the condition is *set* False, the File-Processing paragraph would still execute the Customer paragraph, where there's another GET. Instant abend! (Sloppy programming, too.)

The End-of-File condition should not be set False in the File-Begin paragraph; it should be tested — and then appropriately set True *or* False — at initial-GET time.

William O. Takacs
Manila, Philippines

'Stay Around, DP'

While I can understand Peter Kushkowski's urging a more specific expression than "DP," I do not agree that general usage of the term should be phased out ["So Long, DP," CW, Sept. 22].

When accountants retired their green visors for computer posting and reporting, they did not also retire the term "accountant." Neither have lawyers dropped the designation of their learned profession, despite the proliferation of specialized legal areas.

It has taken all these years in the state tax situation for us to be recognized as the DP industry, deserving of equal treatment with other services and professions. Not to mention, among a multitude of other uses, the Certificate in Data Processing (CDP): What would it mean without "DP"?

Hello, DP. Here's hoping you'll be with us a long time!

Robert M. Sherin
Miami, Fla.

Unreliable Indicators

The June 9, 1980 issue of *Computerworld* contained an article entitled "Users Rate Front-End Software Faulty," which was an editorialized description of the January 1980 Datapro Research Corp. survey of communications processors. During the past few months, Computer Communications, Inc. (CCI) has received several inquiries concerning its standing in the survey, prompting this letter.

Since many computer equipment users are anxious to select the best equipment, software and technical support for their needs, a survey like the Datapro effort could be of use. However, the usefulness of any information depends on its accuracy and validity. Accuracy and validity, in turn, depend on the care with which the information is selected, gathered and presented.

In the case of the Datapro survey, a large number of questionnaires on communications processors/controllers was mailed to Datapro subscribers; a total of 245 users filled out and returned the questionnaire. This group of 245 purports to be a sample of the population of users.

The purpose of a sample is to approximate the measurement or description of the population well enough for the intentions of the user of the survey. The surveyor attempts to create a sample which permits generalization from its findings, within acceptable limits of doubt, and for which costs are minimized. Sometimes these criteria are difficult to apply.

Notwithstanding these difficulties, there are obvious dangers in construct-

Will the Real Application Generator Rise?

(Continued from Page 41)

bling and Data Systems concepts, IBM has proposed software that is a useful and powerful implementation tool, but hardly a significant step in the direction of making application development easier for any but trained DP practitioners. Neither ADF nor DMS was designed to take advantage of precoded application submodules nor are they tools easily learned by novices.

Other Offerings

Another alternative to seeking the meaning of the term "application generator" is to review other software offerings that claim the label.

Consider first the American Management Systems product, Generation 5. This software is contrasted by its producer with procedural languages, and its scope is limited to the development of financial applications. The authors claim that this application generator achieves initial development and lifetime maintenance cost improvement of 60% or better over conventional programming methods.

The components of Generation 5 are said to be five: a specialized language oriented to financial systems, a design methodology, a data management capability, a screen generation facility and precoded functional components common to the application. Included, for the latter, are an automatic audit trail, maintenance of data integrity, data entry efficiency, controlled access to data and data retrieval facilities.

This software system achieves its productivity-enhancing objectives by employing specialized features that accommodate implementation of the financial application. For example, edit and validation processes are automatically invokable and were designed to support accounting needs. Reporting can be requested in form and content that are financially oriented, as in the case of requesting an "aging" report or a cross-footed presentation.

AMS makes another distinction for the application generator by contrasting it with four prior implementation technologies beginning with machine language, assemblers, compilers and finally parameterized languages or precompilers.

Presumably the last three of these methods could be called program generators to distinguish them from application generators, the latter being directly tied to a specific user requirement or function. In this sense, the terminology of application generator is at odds with the IBM usage, where the products ADF and DMS are application independent and more procedural in nature.

In Contrast

A contrast to AMS is another company's offering — the Automatic Information Management System (Aims), made available by Aims-Plus.

Aims is also called an application generator, but its authors claim generality of usage, stating that "it was not designed to solve any specific application." The software has five components: file creation, data maintenance, report generation, file query and data base management.

The system is screen-oriented and users interact by either answering posed questions or making menu selections. The structure and capability of the system is, therefore, preset and limited to whatever generalized features and functions have been implemented by the supplier.

We therefore have at least three different views of what an application generator is and does. As in many areas of data processing, words by themselves do not necessarily tell the story nor are they consistently used. The term "application generator" is another one of those buzzwords that floats around and has not settled. In any event, we see the need for better terminology to distinguish systems such as DMS, Generation 5 and Aims.

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LETTERS

ing small-sample surveys which are easily avoided. A rough but effective rule of thumb for determination of sample size is to ask whether the conclusion would be different if a negligible number of responses (say five or less) was changed. If such a change would affect the conclusion, the sample is probably too small for the purpose.

If the purpose of the Datapro survey is to provide a reasonably reliable aid to the purchase of computer equipment (if the aid is not intended to be reasonably reliable, Datapro should make that clear; it does not), one would not expect to see evaluations based on five or fewer responses. However, the Datapro survey evaluated 13 of 19, or 68%, of the processor/controller categories in its survey on the basis of two to five responses, which, if changed, would alter the evaluation score for those models.

Small samples, then, provide data which is inherently unstable: whether or not the evaluations are "correct" or "incorrect" is *entirely due to chance* as opposed to being reflective of a real-world situation. In essence, evaluations produced from small samples have as much real-world validity as evaluations based on the flip of a coin.

This lack of real-world validity is not only unfair to those managers who rely on Datapro's reputation for industry savvy to back up the validity of a survey; it is also unfair to those vendors who receive a negative rating based on a small sample. For example, CCI's CC-8 communications processor received less than desirable ratings for technical support based on *four* user responses, hardly a sample upon which to base part of a purchase decision. Moreover, CCI has more than 400 systems installed. Four user responses are not a realistic reflection of user satisfaction or dissatisfaction.

Datapro would undoubtedly contend that its survey sample is not intended to meet the standards of statistical validity, but rather to serve as an evaluation based on some number, even if small, of user responses. (Datapro's rule that the weighted average is considered invalid if based on two or less responses is hardly helpful.)

However, given that current and potential users read and react to the Datapro survey (CCI received several inquiries about its negative standing on technical support), it is incumbent on Datapro either to publish evaluations only when backed up by a sufficient number of responses, say a dozen, or to publish a caveat that evaluations backed up by an insufficient number of responses, in this case 68% of the survey, are not reliable indicators of product or service quality.

James K. Sullivan
Manager
Market Research & Development
CCI
Torrance, Calif.

Education Pinch

It was with mixed feelings that I read the article "Some Workshops Feeling Pinch of Recession" [CW, Sept. 15]. As the largest independent provider of classroom education in our industry, QED Information Sciences, Inc. can shed some light on the reasons some workshops are being "pinched" and others are flourishing.

As support for my comments, I refer readers to the timely In Depth article "The Personnel Crunch," by Harold S. Bott, also appearing in the Sept. 15 issue.

To cope with the coming "personnel crunch," Bott emphasized that "additional training is required in the DP department." He further stated that "much of this training must be technical (but also) equally important, DP management must be trained in new management techniques . . . systems planning, operational auditing . . . business fundamentals . . . project management . . . effective presentations, report preparation and leadership."

Thank you, Mr. Bott. You have just summarized what QED has been saying for years! For the last several years, QED has been operating cooperative DP education programs at regional education centers throughout the country.

QED has provided companies with face-to-face education by bringing programs to easily accessible locations. Our programs are growing because our members are able to project their needs, make advance plans and rely on consistently high-quality instruction, regardless of where their personnel take courses.

We are delighted that companies are finally "blowing the whistle" and becoming serious about improving the planning and delivery of continuing professional education. We are pleased that they are finally realizing that high-quality, relevant, person-to-person education need not bankrupt the training department.

Stewart L. Stokes Jr.
Manager
Educational Programs
QED Information Sciences, Inc.
Wellesley, Mass.

Not Mutually Exclusive

Peter Lacey's Reader Commentary [CW, Sept. 8] eloquently and (I hope) finally dissolved the myth that GOTOs and structured programming are mutually exclusive. They are not. Reducing the number of GOTOs may often be desirable, but their total elimination will usually result in near total obfuscation of program logic.

Planning, as Lacey pointed out, is the key to good software. With proper systems planning, program specifications become trivial; with proper program planning, coding becomes trivial — at least nearly trivial in most cases.

But it's so easy to sit down and start coding! Planning, on the other hand, requires that the entire system development process itself be planned. Any methodology that leads in this direction is desirable.

Then there's the economic conflict. "Quick-and-dirty" techniques produce nearly immediate benefits, while an investment in planning yields most benefits in the long term. The art of our profession lies in striking a balance between these extremes. The goal should be the "best" system consistent with economic cost restraints.

Charles W. Hammond
Manchester, N.H.

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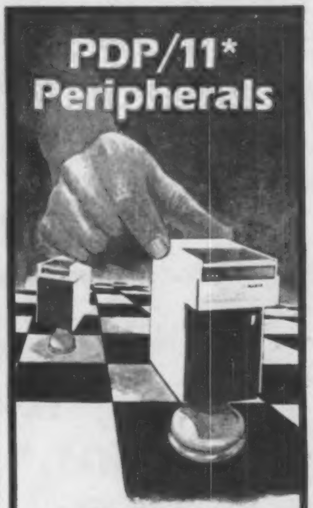

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Prime's 'Taps' Halves Development Time

By Rita Shoor
CW Staff

NATICK, Mass. — A version of a Terminal Application Processing System (Taps) said to cut program development and maintenance in half was announced here last week by Prime Computer, Inc.

The claim of a 50% reduction in program development and maintenance is based on studies conducted by Auerbach Publishers, Inc. and backed up by real-life experience, according to Michael D. Harries, Taps product manager. "The time required to develop and maintain a Cobol application without Taps was reduced by about 50% when we developed the same application using Cobol with Taps," he maintained.

Prime/Taps will be marketed and supported directly by Prime and is available on the vendor's Series 50 equipment. It is a table-driven system designed to aid in application design, development and execution by allowing users to define tables via interactive utilities, a Prime spokesman explained.

In addition to increasing programmer productivity directly, Prime/Taps will have a more subtle positive effect on productivity because it allows nontechnical personnel to perform ad hoc inquiries and generate reports for themselves, claimed Steve Andelman, software systems manager.

IBM Impetus

There was also an impetus to allow Prime systems to fit more easily into an IBM environment and to promote application transportability for Prime customers, he said.

For example, by utilizing Prime's remote job entry, distributed processing terminal executive and Primenet, "IBM users can distribute data developed using Taps without geographical restrictions," he maintained.

This emphasis on "coexistence with IBM" is reflected by the vendor's hookup plans for Prime/Taps. "Prime systems already offer support for 3270 terminals and Prime/Taps is now available on our systems," Harries said. "The hard part is done." And future plans call for tying 3270's together with Prime/Taps.

Prime/Taps consists of three basic modules — a communications interface, a program manager and a data manager. The data management function contains precoded commands to perform the following functions, according to a spokesman:

- Extract records based on search criteria.
- List the records on the terminal in a default or specified format.
- Add, update and/or delete records from a file.
- Print records in default or specified format.
- Search for the occurrence of specific field values in a file.

User-defined tables developed interactively include screen formats, files, application processing flow and security tables.

If the user opts for writing his own command procedures, the user-written code can be inserted at exit points in the precoded functions. This type of addition does not affect the Taps module and, thus, the portability feature is maintained, he said.

With 90-day availability, the communications interface and program manager module combination is priced at $12,000 and the complete package costs $20,000. Volume discounts and monthly leasing terms are also offered from Prime at Prime Park, Natick, Mass. 01760.

All 'Tapped' Out?

Feel as if you've been tapped out? Some people call it Terminal Application Processing System, others refer to it as Transaction Application Processing System, but by any name it is the application development system fondly known as Taps.

Prime Computer, Inc.'s announcement of its Prime/Taps package makes the Natick, Mass.-based vendor the latest in a series of firms that are making this software available to their various customer bases.

Originally developed by Decision Strategy Corp. (DSC), Taps was recently sold to Informatics, Inc. for an undisclosed amount [CW, Oct. 20]. And assorted vendors such as Intel Corp. have been offering versions of what is touted as a programmer pro-

(Continued on Page 50)

System/3 Gets DOS/VSE Translator

BUFFALO, N.Y. — A Cobol-to-DOS/VSE Cobol translator for the IBM System/3 has been announced by Dataware, Inc.

The syntactical Cobol differences between the System/3 Cobol and the DOS/VSE ANS compiler "are minimal and can be handled automatically," according to the vendor.

In the Identification Division, the Program-ID is interrogated and modified to an acceptable syntax format.

In the Environment Division, the SOURCE/OBJECT-COMPUTER clause will be changed to the target computer. The SPECIAL-NAMES clause 'SO3/-SO4/SO5 IS' mnemonic-name will be changed and flagged for post review. The SELECT-ASSIGN implementor name format is different, so SYSNUM will be added and the syntax reformatted.

Also, 3284 printer will be changed and flagged, noting that print spacing will be different. In addition, the 3741 diskette will be changed and the 5444/5445 will be changed to a DOS disk

(Continued on Page 50)

Level 6 Gains Tools for Business

WALTHAM, Mass. — Honeywell, Inc. has introduced the Interactive Business System consisting of five applications modules that will operate on the firm's Level 6 minicomputers.

Written in Cobol, the modules — sales order processing, accounts receivable, accounts payable, payroll and general ledger — run under Honeywell's Gcos operating system. The modules can be implemented individually or used simultaneously.

All applications are on-line and use menu-drive screen processing and tutorial techniques to guide the user through the application with "a minimum of training," the vendor said.

The five modules together cost $22,500; an optional maintenance feature is available. Priced separately, sales order processing costs $10,500 with an annual maintenance fee of $1,050 and accounts receivable, accounts payable, payroll and general ledger cost $3,000 each with a $300 annual maintenance fee.

IDMS Tied to 'Datamacs'

VALLEY FORGE, Pa. — Management and Computer Services, Inc. (MCAS) has added to its Datamacs test data generator an interface to Cullinane Corp.'s IDMS data base management system.

Macs, which also offers interfaces to IBM's IMS and Cincom Systems, Inc.'s Total, claims its recent addition is "the only test data generator facility available for IDMS users."

Datamacs/IDMS reportedly will create a new data base, extend a data base or unload and change a data base. Datamacs is said to handle hierarchical, multilevel, single owner/multimember, multiple member, single owner or network capabilities.

With a 30-day free trial available, the IDMS package costs $17,500 for a 12-month license, including maintenance and updates. Maintenance for subsequent years costs 10% of the purchase price, a spokesman said from Great Valley Corporate Center, Valley Forge, Pa. 19482.

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Programming Aids Aimed at Series/1 With EDX

JACKSON, Miss. — Four programming productivity aids for the IBM Series/1 using the Event Driven Executive (EDX) have been introduced by Conway Computer Consultants, Inc.

Variable-length decimal arithmetic and editing routines for EDL have been added. The EDL CALL instruction is used to access one of five routines: add, subtract, multiply, divide or edit.

It supports up to 14 digits with up to nine decimal places. Data is stored in standard text format allowing easy conversion from or to native binary formats, the firm said. The one-time license fee is $400.

Cobol static screen access routines have been added to provide processing of screen images prepared by $Image. These routines provide all functions to define the screen being used, to write or read variable screen data and to erase the screen. Upon screen read, the value of the program function key is returned, allowing the Cobol user to have full utilization of the 4978/4979 workstations that has otherwise been unavailable, the vendor noted. The one-time license fee of $400 is required.

A disk utility program that utilizes $Diskut3 to provide data set RENAME, ALLOCATE or DELETE has also been added. The program can be invoked in JOBUTIL jobstreams to perform one or two of these functions in one invocation. The one-time license fee of $70 is required.

A Session Manager Cobol Compile, Link, Update option does not execute the program, but automatically deletes the intermediate object modules suffixed #B, #0 and #1. The one-time fee is $40.

Conway Computer Consultants is at 4785 Old Canton Road, P.O. Box 12801, Jackson, Miss. 39211.

Are You All Tapped Out?

(Continued from Page 49)

ductivity tool to their end users [CW, Aug. 4].

But, Prime maintained that the Prime/Taps product is unique in that it will be supported by Prime rather than by Informatics.

"We also have the latest version of Taps," Product Manager Michael Harries claimed. When DSC first came out with the software, it was essentially marketed to software houses as a tool for the batch-to-on-line system conversion process, he recalled. "Then, DSC added end-user capabilities to the package and began marketing it themselves," he said.

Since that time, various enhancements have been added to the point where Prime/Taps offers such capabilities in the data manager module as incorporating multiple record types in a single file and permitting multiple levels of search, he said.

Prime is also entitled to all future Taps enhancements, he maintained.

So, Prime is the latest addition to the Taps bandwagon. And if the product increases productivity to the degree claimed by its vendors, it might be reasonable to expect the sound of Tapping in your future.

System/3 Gets DOS/VSE Link

(Continued from Page 49)

device and the device change noted.

Indexed and direct files will be changed to Vsam format, ACTUAL KEY will become RELATIVE KEY and NOMINAL KEY IS______ will be deleted and flagged, noting that the data must be moved to the record key.

In the data Division, the RECORDING MODE clause will be added to FD statements. Computational clauses will be changed to Display. In all divisions, the "/" in Column 7 will be changed to an EJECT in Column 12. Reserved word differences are automatically identified and qualified according to the VSE specifications.

The system was designed to provide a high percentage of conversion — 98% to 100% of the original program syntax according to the vendor.

Being table driven, the package reportedly can be customized to specific in-house standards. A conversion worksheet is generated and includes diagnostic aid messages to help the programmer determine problems prior to program implementation.

Character set conversion features are also available depending on the type of Cobol-to-Cobol being performed.

Aimed at the IBM 360, 370 or compatible environment running under DOS/OS, with 90K ANS Cobol, the software has a standard annual license fee of $4,800 including maintenance.

Dataware, Inc. is located at 2565 Elmwood Ave., Buffalo, N.Y. 14217.

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Waiting for the train. On the scene in subway stations, Mike is entering actual arrival times directly into the terminal's solid state memory, using the terminal's built-in real-time clock. This data will be used to determine "headway"—the actual time between trains that would-be passengers must wait.

The loading factor. Also being monitored and recorded is the degree of crowding aboard the trains—in Japan at rush hour, loading of trains sometimes exceeds 350% of seating capacity, thanks to the use of "people pushers."

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Arkay Offers DOS-to-OS/VS Aid

NEWTON CENTRE, Mass. — Arkay Computer, Inc. is offering a DOS-to-OS/VS conversion aid that is said to be an automated inventory planning and management control tool for the full conversion.

With Conversion Manager, the user only has to enter DOS job streams and partition standard labels into the package. Conversion Master will then create a master file of all DOS JCL and standard labels, the vendor said.

The package costs $1,500 and is compatible with any IBM or compatible processor, the vendor said from 24 Manor House Road, Newton Centre, 02159.

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With Four Additions

Honeywell Beefs Up TPS-6

WALTHAM, Mass. — Four enhancements to increase functionality have been added to Honeywell, Inc.'s TPS-6, the real-time transaction processing system for Gcos 6 MOD 400.

The new features in Revision 3.0 include:

- A screenforms system that works in page rather than character mode and supports both synchronous and asynchronous displays.
- Support for the Level 6 Cobol-A computer for on-line and batch transactions.
- Ghost, a two-level interactive transaction link to a DPS 8, Level 66/DPS or Level 6 host.
- Secondary keys in the IFS data base plus access security through passwords down to field level and a data base reconstruction tool.

The minimum memory required is 128K words and a typical memory size for an application requiring 15 to 25 terminals is 256K words, allowing for Gcos 6, TPS-6 and user programs. The terminals supported include, in any combination, VIP7700R, VIP7200/7205, VIP7801/7802 and VIP7804/7805.

The TPS-6 executive enhancement costs $7,700, Screenwrite translator costs $2,860 and Cobol run-time director costs $660 and will be available in the first quarter of 1981 from Honeywell, 200 Smith St., Waltham, Mass. 02154.

J.R. Blank's 'Dumper' Released in Version 5.0

GLENVIEW, Ill. — Version 5.0 of the OS/VS utility program Dumper has been released by J.R. Blank & Associates, Inc.

Added features include updating in place of all access methods; the ability to create up to 99 data sets simultaneously from a single input while encompassing any access method mix and record formats; member selection from partitioned data sets based on data content; and unlimited relational selection based on record position or data content to the bit level.

Other features reportedly include the ability to print, list or dump portions of records to eliminate unnecessary printing of large records and the addition of a powerful edit parameter to the current record-altering parameters of move and replace, thereby giving Dumper the full range of record and data manipulation.

Dumper also features a data check handler and abend processor to eliminate unnecessary program stoppage and increased TSO processing with the addition of user prompting and multilevel attention handling, Blank said.

Dumper costs $4,750 for a one-time license fee or $200/mo to lease from the vendor at 2821 Covert Road, Glenview, Ill. 60025.

Cincom Courses Geared To Boosting Productivity

CINCINNATI, Ohio — A program of training courses designed to increase employee productivity in the DP industry is being offered by Cincom Systems, Inc.

The Employee Productivity Program stresses a curriculum approach that enables the student to gain skills and perspectives not possible when individual courses are taken at random, according to Cincom.

Using the Curriculum Planning Guide, a company can take individual employees along a straight line of education and training to reach the desired goals of improved skills and increased job proficiency, Cincom stated.

The content of each curriculum can be tailored to each employee — from new hires through top executives, Potter noted.

Cincom maintains education centers in most metropolitan centers and offers a variety of courses over a 12-month period.

Cincom's schedule of classes is available from the registrar, Cincom Systems Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

'Stop Knocking Those Terminals, Stoop ... They're Ours!'

Software Targets Parts Dealers

GRAND RAPIDS, Mich. — Cascade Data, Inc. has introduced a vertical software package designed for fluid power (hydraulics/pneumatics) parts distributors.

The package runs on Cascade Data Concept III minicomputers using the vendor's CDES operating system.

The package joins three other Cascade vertical software packages: a route accounting system, municipal accounting system and a parts release accounting system.

The price of the fluid power distribution package is $4,500, the vendor said from 6300 28th St. S.E., Grand Rapids, Mich. 49506.

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Work-Load Emulator Aids Planning for OS/VS Sites

MAHWAH, N.J. — A software work-load emulator that reportedly allows users to answer capacity-planning questions empirically is available from Decision Systems, Inc. The product is supported on IBM and equivalent systems operating under OS/VS.

Empact defines anticipated background loads, resources to be drained at specific rates, TSO and CICS loads in their native terminology and determines and defines installation-specific instruction mixes, the vendor claimed.

The product offers the capability to synchronize multiple Empact-defined work loads which can be executed concurrently with the user's ongoing systems, a spokesman said.

Some applications include:

- Computer benchmarking.
- Determining the impact of new work loads.
- Capacity measurement.
- System tuning.

The facilities available in the product are all parameter-driven such that a conclusive set of tests, be it "stress testing" a computer or emulating an additional work load, can easily be constructed, executed, altered and reexecuted within minutes, the spokesman claimed.

Empact costs $15,000, Decision Systems said from 200 Route 17, Mahwah, N.J. 07430.

'JCLcheck' Gains Five Reports

SANTA CLARA; Calif. — Triangle Software Co. has announced Release 2.0 of JCLcheck, said to emphasize JCL production documentation and to detect non-JCL errors that can cause run-time abends in systems running under OS/VS.

JCLcheck is a system utility that validates a job stream's JCL before submission for test or production runs by detecting and diagnosing all JCL errors, a company spokesman said.

Release 2.0 adds five more reports to the package's original two dedicated to production documentation. One is a program cross-reference listing. The second lists all reports created by a job.

The remaining three are summary reports for multijob production systems of the data-set cross-reference listings, program cross-reference listings and complete report listings.

JCLcheck costs $11,400 from Triangle at 2651 Kentworth Way, Santa Clara, Calif. 95051.

System Backs Manufacturers

NEW YORK — A fully integrated manufacturing management system designed to provide comprehensive control and a unified approach to manufacturing management is available from Qantel Corp.

Designated QMRP, the system allows the phasing in of different levels of control. It is capable of performing material requirements handling and, in its full configuration, automates the order planning process and recommends scheduling, a spokesman said.

Other features include Master Scheduling, which provides a coordinated commitment between marketing and manufacturing and customer order processing.

The price for the basic system is $15,000. Three additional modules, available for $6,000 each, cover order processing, purchasing receiving and planning/labor. A monthly license fee is based on the number of modules configured, the vendor said from 4142 Point Eden Way, Hayward, Calif. 94545.

Software Firm Kicks Off With DBMS

BOSTON — American Computer Group, Inc., has formed American Used Software Co. and announced it is offering a data base management system (DBMS) for Digital Equipment Corp. PDP-11 and VAX-11/780 users.

Originally developed by Aeronautical Research Associates of Princeton, N.J., DRS is said to be an application implementation system with complete development capabilities.

A perpetual license for the package starts at $22,000 and with all available options sells for $39,500 from the firm, which can be reached through P.O. Box 68, Kenmore Station, Boston, Mass. 02215. A "substantial" price increase is expected "within six months," according to a spokesman.

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Package Brings System/34 'Closer' to Large Mainframes

OAK BROOK, Ill. – A data base information system designed to bring IBM's System/34 "one step closer to the large mainframe computers" has been announced by Professional Computer Resources, Inc.

Factfinder is said to eliminate simple- to medium-difficulty inquiry and reporting requests from the System/34 applications backlog, "thereby freeing technical staffs to concentrate on the more complex problems associated with the new system's development," the firm said.

The package allows nontechnical users to create on-line displays, information reports or histograms using information existing on the system. Data integrity is maintained because users are not allowed to update files, a spokesman explained.

Confidential information access is said to be restricted through Factfinder security. Other features of the package include multiple file indexes and four-function arithmetic.

Factfinder costs $6,000 including installation, support and documentation. An annual update fee, which the spokesman declined to disclose, includes future enhancements.

The company is located at 2021 Midwest Road, Oak Brook, Ill. 60521.

System/34 Gains Vtocs

• *Computer Tech*

LUDLOW, Mass. – Computer Technologies, Inc. is offering an alphabetized volume table of contents Vtoc for the IBM System/34.

The software has the following features: automatic flagging of duplicate file names; segregation of librafiles, libraries and systems into separate groups; the ability to selectively catalog files based on partial names, such as those beginning with "AR" or ending with "GL"; a tally of space unoccupied by "T" or "P" files; a single listing of all files in one or two magazines; and page numbering.

The product costs $100. Computer Technologies can be reached through P.O. Box 259, Ludlow, Mass. 01056.

• *Assurance Systems*

BANGOR, Maine – A volume table of contents (Vtoc) for IBM System/34 users that prints files and libraries alphabetically, by block location, by creation date, decreasing by percent or decreasing by size is available from Assurance Systems.

With the S/34 Vtoc Manager, "information is produced on the number of blocks used by individual files and libraries regardless of their creation keyword parameter, the vendor claimed.

Unnoticed data about how full files are is shown, pinpointing both those files that are close to capacity and those that are overallocated and wasting disk space, a spokesman said.

The one-time license fee for the product is $100, Assurance Systems said from 64 Congress St., Bangor, Maine. 04401.

Package Backs Move to S/38

IDAHO FALLS, Idaho – HK Contractors, Inc. is offering an IBM System/34 to System 38 RPG conversion utility package that reportedly includes the provision to convert programs to use externally described files.

That ability allows the programmer to respond more quickly and efficiently to changing user needs, the vendor claimed.

The menu-driven system includes:

- RPG-II to RPG-III conversion.
- System/34 "SFGR" specs to System/38 display.
- File DDS conversion.
- Data file conversion aids.
- Validity checking of data during file loading.

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The software was previously priced at $10,000 for all modules included in the total package, with additional copies available for $3,500. The new pricing structure has unbundled the major modules to provide users with increased flexibility, the vendor claimed.

The basic Image transaction definition software now costs $6,000. The custom programming facility, which permits the use of custom-coded programs, sells for $2,000. TPMGR, which provides start-up, shut-down and message broadcasting for terminals running Insight, licenses for $1,500. TP/3000, the execute-only version of Insight, costs $1,500.

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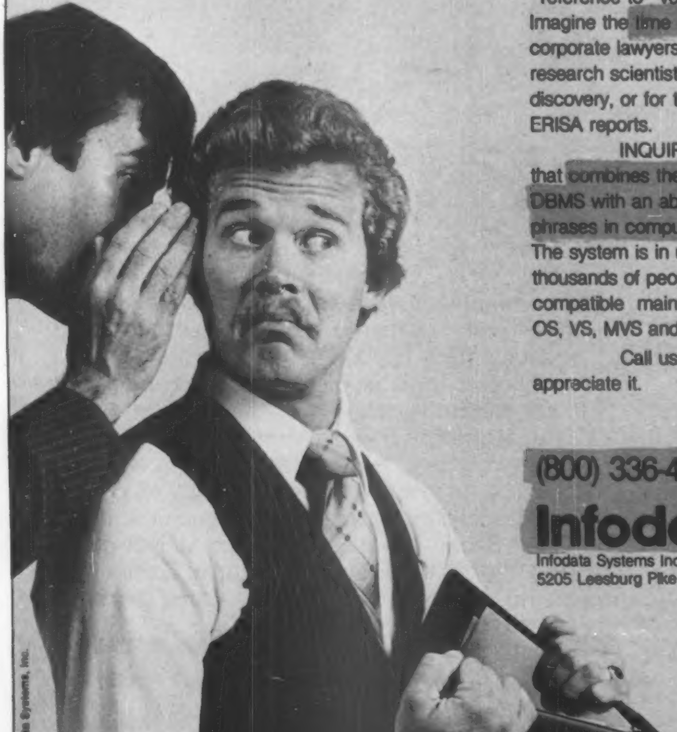

Management And Distributed Computing

By Robert W. Shirey

Part 4: Analysis and Synthesis

"Distributed processing is not invariably cheaper than centralized processing."

— Felix Kaufman, 1978

"It would be nice to have a cost model which enabled the optimal 'degree of distribution' in particular circumstances to be calculated [Down76]."

In life-cycle terms, strategic planning takes place during a system's initiation phase [FIPS64], before the development and operation phases begin [FIPS38]. The initiation phase includes establishing objectives and general requirements, identifying feasible alternatives and estimating the consequences of strategic choices by analyzing costs and benefits.

Cost-benefit analysis in computer-based systems depends on identifying and analyzing all the design alternatives. The multiplicity of alternatives is what makes the analysis difficult for a distributed computing system (DCS). However, the problem can't be avoided, because for top management, return on investment is usually the key decision factor.

For smaller systems and early strategizing, a rough, preliminary payoff analysis may suffice. The next section reviews some guidelines for such cases. Other cases require rigorous, detailed, life-cycle models as discussed in the sections that follow.

Cost-Benefit Analysis

Often it is the cost-benefit analysis of an operational problem that leads to the idea of building a DCS. For gross strategic planning, the analysis need not be very complicated. Simple budget comparisons, ignoring technical details, can often indicate whether a system should be distributed.

This section reviews guidelines for performing a preliminary DCS cost analysis. The guidelines include:

1) What costs to consider.
2) How costs relate to the degree of distribution.
3) What direction costs will take in the future.

Sternberg describes a preliminary cost study for a system to service 125 agency locations for a large insurance company [Ster77]. Six alternative configurations were analyzed, two centralized and four distributed. The study estimated one-time and ongoing costs for development and operation:

- **Operational Costs.** Remote hardware, central site hardware, data communications, installation, maintenance and operations.
- **Development Costs.** Training, system support, standard and specialized system software and testing.

Thierauf's book also has case study examples of cost-benefit analysis [Thie78]. To estimate savings and incremental costs for each design alternative, he suggests three cost categories, as summarized here:

- **Savings.** Reduction in personnel and associated wages, benefits and taxes; elimination of unnecessary equipment and associated space, utilities, repairs, insurance and taxes; elimination of outside services.
- **One-Time Costs.** Feasibility study and its documentation; programming, integration and testing; training; conversion of data base and operations; parallel operation during transition; equipment and supplies.
- **Operating Costs.** Equipment rental, depreciation and upkeep; software maintenance; support personnel; supplies and miscellaneous.

Charles P. Lecht suggests two cost categories — one-time and repetitive.

(Continued on In Depth/2)

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

(Continued from In Depth/1)

Lecht claims that, in general and in total [and in constant dollars], one-time costs are falling and repetitive costs are rising.

- **One-Time Costs.** System design, system development, application development,- hardware, conversion, training, installation and testing.
- **Repetitive Costs.** System software support, application software support, hardware maintenance, communications, operations, data entry, downtime and recovery.

Naturally, the cost-benefit methodology must suit the problem at hand. King and Schrems have surveyed techniques for cost-benefit analysis in information systems development and operation [King78]. For further background, Mishan's book is valuable [Mish76]. But no matter what cost categories and methodology are used, the goal is to discover whether a DCS can provide service at a lower cost than some comparable centralized system.

Building Rough Models

Down and Taylor show how to build and use rough models that relate the cost of system components to the degree of computing distribution [Down76]. Degree of distribution for system components is calculated from a weighted average of several factors, such as input, output, processing, file volume and rate of access. For each factor, degree of distribution is defined by comparing local functions with total system functions. For example, the degree of distribution of terminal input could be the number of characters entered and used locally divided by the number of characters entered.

Factors and weights are selected arbitrarily for a given analysis. "Increasing the degree of distribution in the system will increase certain costs and decrease others and it is necessary to consider these trade-offs in order to decide the optimum solution."

Down and Taylor discuss and graph the relationship between degree of distribution and three component areas: local processing capability, central processing capability and data transmission facilities. Their generalized cost model and their three case studies all tend to support the conclusion that "the lowest cost system is a partly distributed one." That is, distributed computing solutions tend to cost less than centralized or decentralized solutions to the same problem.

This conclusion is similar to one drawn by Ein-Dor and Seger [EinD78]. They say, "It appears there is an optimal balance of advantages and disadvantages" between centralization and decentralization. "This leads to an observed tendency to regionalize rather than centralize data processing capability."

In addition to establishing cost categories and relationships, a preliminary cost-benefit analysis needs to consider the direction of future cost trends. Stefferud estimates these directions along with other trends in computation, communications and word processing [Stef78]. His assumptions include the following:

- Hardware costs will decrease by a factor of 100 every decade. However, as Amdahl points out, "Even if the cost [of hardware] went to zero, the price wouldn't [Amda78]." Micrologic is only a part of a system, systems are also adding new functions and marketing costs are rising as competition increases.
- Software costs will decrease by a factor of 10 every decade.
- Communications costs will decrease by a factor of 10 every decade.

Detailed Analysis

Although cursory analysis may be enough to begin a project, continuation to implementation requires more sophisticated thinking. This section reviews three papers which, when contrasted with the previous section, show how much more detailed cost-benefit analysis can become. The first difference is in what costs are examined. Preliminary analysis can get by with considering only a few key variables. At later stages, the analysis must broaden to consider, and to manage, all costs associated with information processing.

All cost must be identified. Strassmann discusses why a broad analysis is needed and presents a nine-step method for identifying, measuring and managing information costs [Stra76]. He describes three information processing cost sectors extending far beyond the computer hardware, where most DCS design attention is focused.

- **Data Processing.** "Aside from the costs of computers, terminals and peripherals, this sector includes expenses for such things as computer services, time-sharing, data processing suppliers, data communication, programming support, operating labor and consulting."
- **Administrative Processing.** "Everything from typewriters, word processors and dictating equipment to tel-

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Budget Process

The first three steps of Strassmann's method, as practiced at Xerox, Corp. establish an adequate accounting and budget process.

1) *Cost Categories.* Identify and classify — by function, technology and organizational unit — all components of information processing costs. This can take years.

2) *Unit Costs.* Track unit costs for system work items and outputs. Define the unit measures at a low, working level so that problems can be traced to their origin.

3) *Standard Costs.* Establish predetermined targets for what unit costs should be.

Cost Management

The next four steps focus the organization on cost management.

4) *Accountability Centers.* Set up teams that have accountability and responsibility for well-defined, operational, information processing tasks.

5) *Competitive Pricing.* Set market prices for services rather than pricing at cost. This simplifies accounting, encourages use of new technology and motivates managers through profits.

6) *Long-term Planning.* Fund investments on a multiyear basis and tie budgets to long-range contracts with users.

7) *User Control.* Put the system development and control staff in the user's planning area where trade-offs can be made between information processing and other functions.

Human Work Needs

Finally, Strassmann calls for redirecting planning emphasis toward human work needs.

8) *Deemphasized Technology.* Reorient technical managers to take a broader, balanced view that encompasses the people sector just as much as the data processing and administrative processing sectors. The goal is increased productivity of information resources.

6) *Job Enrichment.* Design systems to include elements of computer-aided instruction that can help to expand task content and job scope for users such as terminal operators. The goal is increased productivity through greater job satisfaction.

Benefit interrelationships must be understood. Although cost identification and control is difficult, identification and reconciliation of desired benefits can be more difficult.

Mariani proposes a way to formalize and make tractable the analysis of DCS design trade-offs [Mari77]. His method uses tree structures to represent payoff measures and their relationships. A claimed advantage of the method is that the trees, although they quickly become very complex, can be automated using a general-purpose data base management system.

Three-Step Process

Mariani's method can be restated as having three formal steps.

1) *Definition.* Development of payoff measures. The fundamental measures used in Mariani's example are performance, reliability/availability, growth, deployability, life-cycle cost, survivability, fault tolerance and [physical] form factor.

2) *Description.* Incorporation of payoff measures and their relationships into the design process.

3) *Solution.* Selection of a design from among the alternatives.

Mariani's paper primarily addresses the definition and description steps. He formalizes the DCS design procedure as a sequence of design activities. Each activity is defined by stating its objectives, constraints and decision points. The objectives, constraints and decisions are parameterized by a common set of design variables. The cost-benefit payoff measures are defined with these variables and included in the objectives and constraints.

Mariani uses a top-down method to

(Continued on In Depth/4)

Buddy Pollard, Tom Clausen

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(Continued from In Depth/3)

decompose payoff measures into quantifiable factors. After defining the payoff trees, it is necessary to quantify the relationship between a factor on one level and its contributing subfactors on the next level. He notes that several decomposition approaches are in use:

- **Subsystems.** Decomposition by functions such as data entry, data base storage and report generation.
- **Hierarchies.** Decomposition by organizational levels such as networks, subnetworks, nodes and processors.
- **Viewpoints.** Decomposition by "levels of abstraction" such as functional, virtual and physical.
- **Programs.** Decomposition by software elements such as communications software, operating system and application system.

Some Complications

Mariani points out that several problems complicate his method and reduce "the feasibility of deterministic design using payoff measures." Problems include:

- **Incomplete Definition.** Not all design factors are known. Those that are known are too numerous to manage well.
- **Incomplete Description.** Relationships between factors are not well understood. Interaction data is sparse.
- **Incomplete Solution.** Better algorithms are needed for manipulating the trees.

Costs and benefits must be merged with other issues. Just as costs and benefits are interrelated, management must integrate cost-benefit analysis with other planning and development processes. Bloom and Knapp describe "a computer-assisted planning and development methodology which attempts to fully integrate the requirements data base, the analysis and evaluation models, the resource optimization routines and the performance monitoring and evaluation subsystems [Bl0078]." Although their paper talks about data communications networks, their methods apply to any DCS.

Bloom and Knapp recognize that typical computing systems do not have fixed requirements. The requirements continually change — from conception through inception to termination. Designers thus require life-cycle models, and these models must have a variety of subsystems to address various design issues.

Analytical Tools

Bloom and Knapp discuss the analytical tools and techniques listed below. The list includes the kinds of tools needed to study the costs and benefits identified by the accounting and payoff tree methods of Strassmann and Mariani.

- **Application Profile.** Bloom and Knapp differentiate between strategical (or qualitative) and tactical (or quantitative) design parameters. Their strategical parameters are compatibility, availability, reliability, maintainability, flexibility, expandability, security, reutilization, sharing and cost impact. Their tactical parameters are topology, traffic, processing and performance.
- **Capacity and Performance Models.** These use analytic solutions and discrete event simulations in an iterative design procedure to produce preliminary configuration estimates.
- **Component Cost and Life-Cycle Cost Models.** Preliminary, general designs are compared with empirical assessments. All development, acquisition, installation, operation and maintenance costs are summarized in a total life-cycle budget. Cash flows are discounted to present values to allow comparison of alternative designs on an investment basis.
- **Optimization and Monitoring Systems.** Software packages balance performance against cost and select least-cost solutions from among alternatives. Hardware and software systems gather operational data to validate and improve designs.

This section on payoff analysis has concluded with the thought that cost-benefit analysis should be integrated into a comprehensive design methodology that covers the whole DCS life cycle. The next section begins by establishing criteria for assembling or selecting such a methodology. Then it reviews some candidate methods and techniques.

"We have not found a single, existing design approach which adequately

treats the extremely complex and varied goals of distributed computing design [Mari79]."

In 1977, a group of DCS experts reviewed the state of the art and "agreed that the field is so young that little formalism and few fundamental principles have emerged [Eckh78]." They concluded that, "as more experience is gained, and the field matures, more attention will presumably be paid to methodology and the systematic study of design trade-offs."

Their prediction was already coming true when they made it. Business and government were already spending heavily on distributed systems. Technicians were struggling to invent ways to make the systems easier to assemble and operate. Managers were running to catch up with the growth of usage, which seemed to be out of control.

This section reviews some general approaches to DCS design — approaches that both managers and technicians can use at several different levels of design detail.

Eckhouse outlined many open areas in DCS research [Eckh78]. Two of them are relevant here.

One problem he posed takes a technician's view of DCS design: "No complete systems analysis or synthesis methodology exists, either for distributed processing or for simpler, centralized systems — although there does exist a small collection of tactics in the areas of physical and logical interconnections, resource allocation and fault tolerance, detection and isolation. We also know some of the advantages and disadvantages of different topologies, restricted almost exclusively to hierarchies, stars, buses and rings (loops)."

Technicians want a method that can pick and put together computing components to solve a given problem. Managers take the more general posture represented by another of Eckhouse's problems: "What attributes of a problem make it suitable or unsuitable for distributed processing? How does one weigh the advantages and disadvantages of distributed vs. centralized systems?"

Not So Bad

The actual situation in both the technical and management areas is somewhat better than the quotations indicate. True, there are no "complete" methods, no cookbooks that get along without subjective human judgments. But partial methods abound, and several have been presented in this series. Many other design tools exist that can be gathered together into a DCS design toolbox. In general, it is necessary to push together the previously separated knowledge of technicians and managers.

A design methodology is not just a collection of techniques. Before assembling or acquiring a DCS design methodology, managers and technicians should stop to consider the design of the methodology itself. They should think about what they want the methodology to do and should establish criteria to evaluate it.

Bryce did this for commercially offered, packaged methodologies for software development [Bryc78, Bryc79]. His main ideas, which carry over nicely to DCS design, are summarized here.

For Bryce, a system design methodology (SDM) is not just a bunch of technical guidelines for computer system performance. An SDM is a complete logical method, with precise decomposition rules "for developing effective systems to meet the information requirements of an organization."

In other words, Bryce insists on the same broad organizational perspective that Part 3 of this series called the top management view. His reasons are similar; a narrow perspective tends to develop systems that "solve the wrong problems." A limited technical perspective ignores personnel and administration, making implementation difficult, unpopular and costly.

On the other hand, an SDM, no matter how broad, can neither replace good managers nor make good ones out of bad ones. An SDM is simply a tool that can play a powerful role when properly used.

Criteria for Evaluation

Bryce lists 48 explicit evaluation criteria for SDMs and their vendors. His criteria stress management aspects of the methodology in order to force a broad perspective that can recognize and satisfy fundamental organizational needs.

(Continued on In Depth/6)

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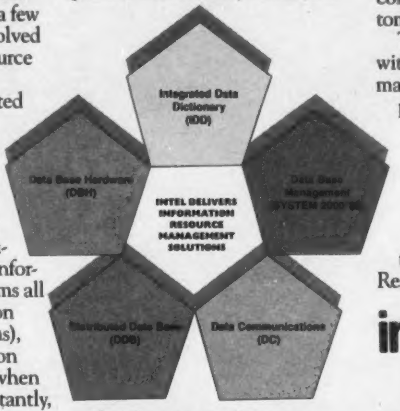
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IN DEPTH

(Continued from In Depth/5)

His criteria that carry over to DCS design can be grouped as follows:

- **Scope and Completeness.** An SDM should use a structured method, one built upon a small set of basic items and measures. The method should take a comprehensive approach, concentrating on organizational problem-solving rather than data processing technology. The method should make logical design decisions before selecting physical hardware or software. The method's basic units should also extend and apply to system development and maintenance decisions.
- **Usage Flexibility.** Because computing technology changes rapidly, an SDM should be independent of the design techniques it uses and be able to make use of new ones.
- **System Documentation.** Complete, up-to-date documentation should evolve out of the SDM as a normal by-product of the design process. The language and formats used should be standardized and commonly and easily understood by managers and technicians.
- **Development Control.** An SDM should encourage a dialogue between managers and technicians and between developers and users that extends beyond design into development and implementation. User managers should play an active part in a design process that has frequent checkpoints for review and approval. The design process should permit, but control, design changes and should project system acceptance criteria.
- **Resource Management.** An SDM should produce economic and schedule data. It should support cost-benefit analysis and leave a project audit trail.

This list of functional criteria can be further summarized by two statements. First, Bryce seems to say that an SDM should support and be guided by the organization's strategic planning process. Second, he says an SDM should contribute to estimating, analyzing and controlling the consequences of the design choices, both strategic and tactical.

Organizational issues must be resolved before successful implementation can take place. That is the essence of the previous section. As an example of an approach that meets Bryce's criteria, consider Poppel's list of 10 steps to successful system strategic planning [Popp79]. Some steps have been restated here for generality.

1) *State functional strategy.* The top managers of each major functional unit of the organization explicitly agree on strategy and assumptions.

2) *Find critical success factors (CSFs).* Within the basic strategy, determine these factors: key decision points; key activities and how to measure their level; key resources and how to measure their consumption; and how to evaluate results against objectives.

3) *Match CSFs to information flows.* Define sources, users, content, timeliness, accuracy and form of information needed to support critical decisions and measurements.

4) *State information technology assumptions.* Estimate availability, price and performance of hardware, software, data communications and key resources.

5) *Design systems and meet information needs.* Merge information flow definitions and technology assumptions and categorize them according to application type: conferencing, information transfer, information retrieval, transaction processing, personal processing and activity management. Pick a set of systems that solve information flow needs and adjust system architectures for compatibility.

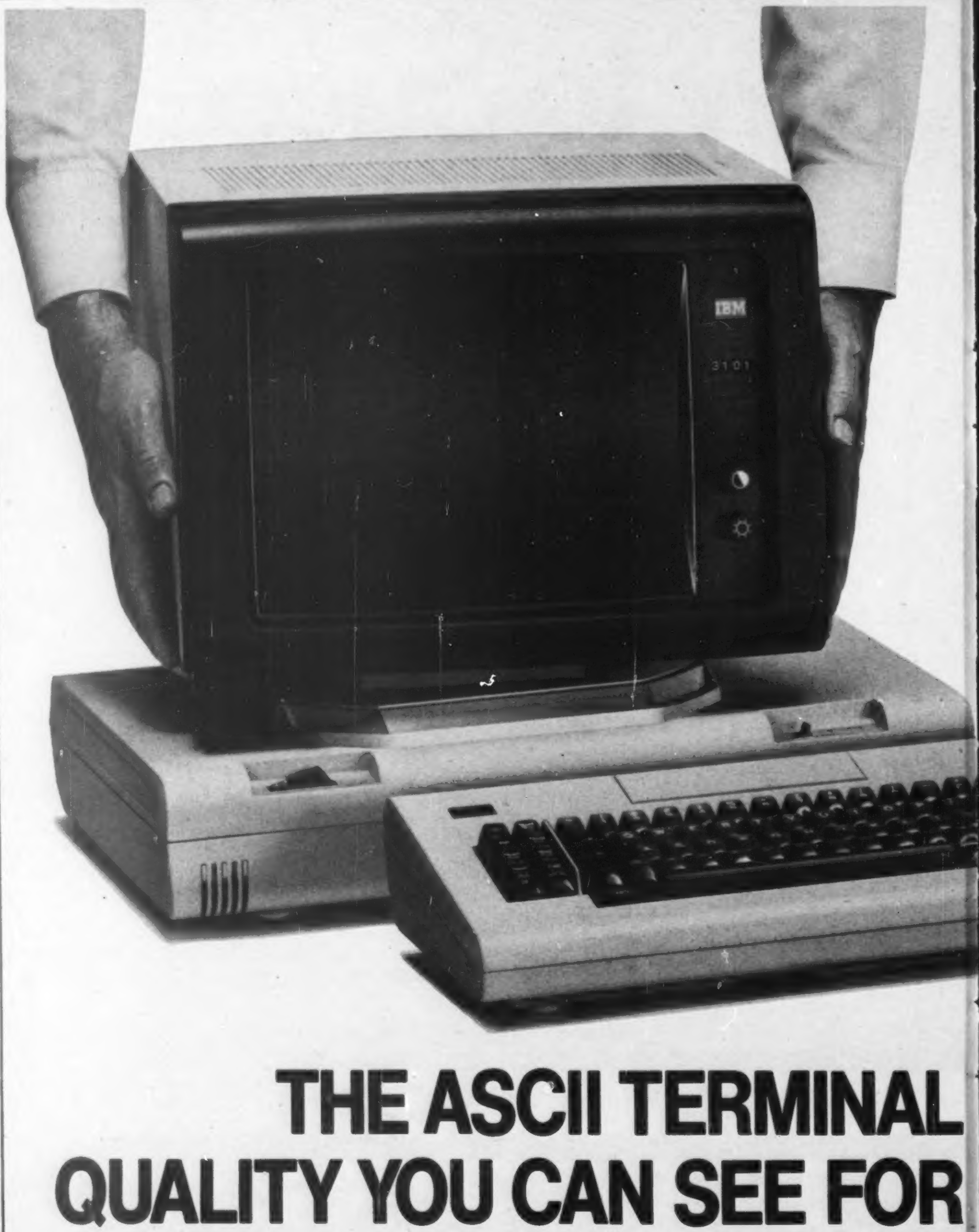
6) *Prioritize solutions.* Use qualitative impact estimates and building-block interrelationships to order the selected designs for implementation.

7) *Estimate resource needs.* Estimate the quantity and quality of people, equipment and financing required to develop and operate each proposed system.

8) *Determine resource constraints.* Survey the quantity and quality of human, technical and financial power available within the organization.

9) *Set implementation schedule.* Adjust solution priorities to conform to organizational resource constraints.

10) *Design management processes to support new systems.* Upgrade the organizational structure and management techniques to fit with new system solutions and achieve their intended benefits.



Familiar techniques are still applicable. Teeples, Shirey and Henderson incorporate ordinary systems analysis techniques in a methodology similar to Poppel's in order to study federally sponsored employment security (ES) operations [Teep79]. These include the U.S. Employment Service, U.S. Unemployment Insurance Service and related work. These operations, mainly performed by the states, use many highly automated systems. The study goals are as follows:

- **DCS Management Roadmap.** Guidelines for development and evolution of ES systems as technology turns toward distributed computing.
- **DCS Evaluation Standard.** A qualitative model for judging the completeness and appropriateness of state automation proposals for distributed systems.
- **DCS Progress Plans.** Specific suggestions for the near future for proceeding into distributed computing.

The study work plan also has 10 steps:

- **Define functions.** Name and describe the ES functions to be accomplished, rather than the means of accomplishment. Build a successively more detailed hierarchical structure where each function at any level is a subset of the function above it. Be fresh and objective; avoid mimicking the organization or computing system structures.
- **Define flows.** At each hierarchical level, define the information flow requirements in terms of inputs, processing and outputs. (This and the preceding step used the Hipo technique [IBM74].)
- **Define processes.** With functions as building blocks, use ordinary flowcharts to diagram the major systematic arrangements for doing work.
- **Define decisions.** Within the processes, name and describe the decision points.
- **Define systems.** List existing and planned systems available to support the functions, flows, processes and decisions.
- **Define opportunities.** Cross-reference functions, flows, processes, decisions and systems to find deficiencies and redundancies.

Parallel Viewpoints

The next three steps examine the ES functions from three parallel, independent viewpoints:

- **Analyze computing requirements.** For each function, determine needed access modes, throughput volume, response time and data base scope.
- **Analyze organizational factors.** For major functions, use Rockart's decision model to analyze centralization vs. decentralization issues.
- **Analyze technology potential.** For major functions, estimate the impact on ES effectiveness of the DCS characteristics listed in Part 2 of this series.

The final step summarizes the conclusions for the previous three and makes strategic recommendations for managing development plans, organizing for standards planning, undertaking pilot projects and selecting functions with the largest expected payoff

Quantitative Design Methodology

The foregoing study of ES systems uses only qualitative methods, and such methods suffice for many strategic management choices, such as the degree of organizational decentralization. However, even at a high, strategic level of DCS design, quantitative methods soon become necessary.

First, management needs quantitative estimates to support trade-off decisions regarding costs, risks and benefits.

Second, to satisfy Bryce's criteria, quantitative estimates are needed as bridging between the planning and development processes.

This section describes two methodologies, one proposed and one implemented, that favor automated, quantitative techniques.

Multiple viewpoints are useful in analyzing DCS functional requirements. But the differing perspectives must be synthesized. Becker argues for a unified "frame of reference" from which all types of distributed computing systems can be defined and designed [Beck78]. As his basic building blocks for stating system requirements, he takes three kinds of functions:

- **Information Processing.** Manipulation of information to produce a desired result.

(Continued on In Depth/8)

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(Continued from In Depth/7)

- **Network Processing.** Movement of information between DCS nodes.
- **Data Base.** Storage of information in forms convenient to system users.

High-Level Objectives

Given these functions, the objectives of high-level system design work are as follows:

- **Select functional distribution.** Determine the nodes at which each of the three kinds of functions should be performed.
- **Select functional density.** Given a functional distribution, determine how much capacity should exist for each function at each node.
- **Select hardware and software.** Given a functional distribution and density, determine the best combination of equipment to perform the functions.

Muftic and Husovic state similar concepts but do it more formally [Muft78]. As background, they name three kinds of distribution: functional, topological and organizational. They say, "The main criterion for any distribution is the frequency of usage of the particular function, so that each of them should be located and executed as close to the transaction source as possible."

For them, the key DCS design issues are:

- **Functional Distribution.** Determine which functions to distribute and which to centralize.
- **Functional Density.** Determine where to locate the distributed functions.
- **Requirements Primacy.** Determine how to design a DCS with the operational requirements as a starting point and not as an achieved result.

Almost a Joke

The last issue is almost a joke at this stage in computing technology. But Becker, too, feels it is a problem. He says, "To solve a problem, first define

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it. That's the idea behind a network planning philosophy that reverses *the traditional sequence of first selecting hardware and software models and then configuring the network* [Beck77, emphasis added]."

Instead, the sequence should start with the definition of the users' requirements for information processing, network processing and data base functions. Then a system should be fit to the requirements.

Becker suggests six characteristics to use in defining DCS functional requirements [Beck76]:

- **Topology.** Quantitative geographic identification of system nodes and constraints such as "buildings, cities, states, telephone area codes, time zones, countries, continents."

> *'Bottom-up analysis is hard to avoid. To analyze quantitative details, it could be necessary to work at the component level, the bottom level in Becker's six-deep hierarchy. Only at that level can we understand timing relationships that cause delays and bottlenecks. The problem in working at such a low level is in relating the analysis to high-level objectives.'*

- **Volume.** Information flow descriptions and distribution profiles.
- **Processing.** Physical and logical description of existing processing facilities and those that need to be located within the DCS.
- **Response.** Statement of required response times per application class.
- **Availability.** Profile of each application class in terms of what percent of each day, week or other period the application needs to be in operation and at what nodes.
- **Security.** How well the functions of each application class must be guarded.

To further classify functional requirements, Becker outlines a third taxonomy [Beck73]. This one is the skeleton for a six-level, top-down decomposition of DCS functions. His six levels are:

1) *Network Level.* State the whole problem in general terms.

2) *Processing Level.* Separate the problem into functional areas such as information processing, network processing and data base processing.

3) *Macro Level.* Further separate processing level functions into hardware functions and software functions.

4) *Micro Level.* Further separate macro level functions into generic tasks.

5) *Element Level.* Select specific task forms for each micro level function.

6) *Component Level.* Select specific hardware devices and software techniques for each element.

Four-Level Example

Becker illustrates this six-level structure with a four-level example:

Level 1. Information Network Function (a DCS).

Level 1.1. Information Processing Functions.

Level 1.1.1. Information Processing Hardware Functions.

Level 1.1.1.1. Includes processing, storage, interactive input/output, noninteractive input/output and switching.

Level 1.1.2. Information Processing Software Functions.

Level 1.1.2.1. Includes languages, applications, utilities, file management, task management, resource management, integrity, statistical recording and supervisory control.

Level 1.2. Network Processing Functions.

Level 1.2.1. Network Processing Hardware Functions.

Level 1.2.1.1. Includes concentration, coupling, distribution, switching and source/destination interfacing.

Level 1.2.2. Network Processing Software Functions.

Level 1.2.2.1. Includes routing, integrity, journaling, statistics, utility and supervisory control functions.

Feasible Configuration

Equipped with three schemes to classify DCS functions, Becker lays out a six-step sequence for analysis and design. Given a user's requirement statement as input, his process aims to produce a feasible, optimized equipment configuration.

1) *State functional requirements.* Convert topology, volume, processing, response, availability and security parameters into computer-readable form.

2) *Derive candidate configuration.* Analyze requirements and attempt to determine optimum functional distributions and densities. Perform physical design by specifying hardware devices and locations. Perform logical design by specifying software modules and locations.

3) *Predict candidate's performance.* Use step 1 load specifications to stress model of configuration from step 2. Repeat step 2 as necessary to acceptable result. Produce final candidate design and prediction of its performance.

4) *Install and operate.* Use the final candidate design to create or identify equipment lists, carrier facilities, operations manuals, protocols, resource mappings and software procedures. Assemble components and start system.

5) *Measure system performance.* Gather statistics from operational system and compare to step 3 performance prediction. If actual performance is poor, either repeat earlier steps to produce alternative configurations or correct step 3 prediction algorithms.

6) *Evolve and adapt.* Use this six-step sequence to respond to changing requirements during the system life cycle.

Becker wants to automate most of his sequence. He says, "Within the current state of the art, there exists no visible, single computer program to which a requirement statement is fed, and the best possible solution, complete with formal proof, results [Beck76]." But he also says there are many tools, both automated and manual algorithms, that could be combined.

Hard to Avoid

Bottom-up analysis is hard to avoid. To analyze quantitative details, it could be necessary to work at the component level, the bottom level in Becker's six-deep hierarchy. Only at that level can we understand timing relationships that cause delays and bottlenecks. The problem in working at such a low level is in relating the analysis to high-level objectives. This section illustrates that problem.

Stack describes a quantitative DCS design methodology intended to provide data for both strategic long-range plans and tactical development specifications [Stac79]. For example, it has been used for a study of electronic mail in the 1980s [Twee79].

The methodology characterizes the relationships among hardware and software architectures, projected work loads, performance and life-cycle costs. It uses a collection of automated modeling techniques to rapidly examine relational sensitivities. "The methodology characterizes the cost and performance trends of preliminary designs so that bottleneck sensitivities can be surfaced, design corrections can be investigated, alternatives can be compared and financial plans can be programmed."

The methodology has five major inputs and five steps. The inputs are as follows:

- **Architecture Primitives.** The methodology uses an analytic model based on queuing theory. The model sup-

(Continued on In Depth/10)

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(Continued from In Depth/9)

ports analysis of four different vertically distributed structures. They range upward in complexity from a host with simple terminals to a host and several cluster processors each supporting several intelligent terminals.

- **Development Philosophy.** This includes both a strategy for when and how to upgrade hardware capacity and a set of financial assumptions on residual hardware values.
- **Cost and Performance Trends.** In multiyear analyses, the methodology's cost model uses financial and technical trend assumptions to compute life-cycle costs for application software, computer and communications equipment, facilities and personnel.
- **Application Work Load.** The methodology's performance model analyzes the steady-state operation of one of the architectural primitives under a specified work load. A work load is specified as a set of application functions, their occurrence rates and their distribution in the total work-load mix.

Each function is described as a single thread of activity through a series of system nodes. A full description for each function includes the mean value and distribution of each of the following at each host, cluster processor and intelligent terminal:

- Application instructions per transaction per node.
- Executive requests per transaction per node.
- Storage requests per transaction per node.
- Characters moved per storage request.
- Communication requests per transaction per link.
- Characters moved per communication request.
- **Capacity Parameters.** The methodology's performance model requires initialization estimates of the mean value and distribution of each of the following for each node:
- Instructions-per-second executed per node.
- Instructions executed per executive request.
- Instructions executed per storage request.
- Instructions executed per communication request.
- Number of storage servers per node.
- Accesses-per-second executed per storage server.
- Operating system storage requests per application storage request.
- Characters-per-second moved per server.
- Characters moved per operating system storage request.

Also, for each communications link between a pair of nodes, the model requires data on distance, transmission rates and other performance characteristics.

The methodology uses these inputs to produce as output a collection of preliminary, technically feasible designs and associated life-cycle costs. The methodology uses analytic performance modeling and cost projection techniques in a five-step structure:

1) **Analyze requirements.** This step records current and future needs in a form that aids in evaluation of design alternatives. The major source documents are the statement of operational requirements (SOR) and the functional description (FD). The FD describes the system from the user's view, defining capabilities, imposing constraints and forecasting changes with time.

2) **Formulate criteria.** This step defines a basis for consistent evaluation of alternatives. It qualitatively defines the significant factors to be analyzed, the quantitative measures to be used and the sensitivity factors, or how results vary with assumptions in the five input areas above.

3) **Select alternatives.** This step picks preliminary designs to be examined for

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feasibility and compared. This step has five qualitative substeps:

3-1. Propose structures. List and classify the architectural alternatives that are likely choices.

3-2. Identify objectives. Derive design objectives from functional descriptions.

3-3. Identify problems. See whether objectives are thwarted because of work load distribution of preliminary structural choices.

3-4. Assess applicability. See how well current and proposed systems support the projected work load.

3-5. Select candidates. Based on the foregoing analysis of qualitative factors, choose designs to be studied further.

4) Model behavior. This step uses manual and automated tools to predict performance and cost of the designs selected above. This step has eight quantitative substeps to predict performance:

4-1. List events. Compute relative frequency of functions and service requests.

4-2. Total events. Produce aggregate work-load figures.

4-3. Measure service. Determine mean service times at each node for each transaction.

4-4. Count visits. Determine number of transactions per node per design alternative and life-cycle time point.

4-5. List branches. Calculate probability tree of system evolution possibilities.

4-6. Count arrivals. Calculate transaction arrivals per second at each node as a function of desired throughput rate, number of active terminals and evolution branching probabilities.

4-7. Measure delays. Calculate service delays at each node.

4-8. Calculate response. Use visit counts and delay values to calculate response times as a function of throughput rate.

This step also computes the present-value cost of each alternative at each time step, interest rate and inflation rate specified. This step's chief outputs are curves of response time vs. throughput rate and cumulative costs vs. time for a given design.

5) Evaluate alternatives. This step uses the evaluation criteria from step 2 to compare the feasible designs. Managers use the finding of this step to form conclusions and make recommendations on a final design selection.

Strong Points

Although new and not fully developed, this methodology described by Stack and Tweedy is significant for several reasons. First, it demonstrates the feasibility of assembling a DCS design process that quantitatively considers cost and performance factors at a strategic level. Second, it shows that Bryce's criteria for a system design methodology can be met when designing a DCS.

This methodology does integrate with the strategic planning process — in fact, it partly parallels Poppel's steps — and it does estimate, analyze and support control of the strategic and tactical consequences of a design. Finally, it is comprehensive and independent of particular analysis techniques.

Besides its significant strengths, this methodology also has serious weaknesses. First, for a methodology that claims to support high-level planning, it seems strangely bottom-up. The five basic inputs to the design process — architecture primitives, development philosophy, cost and performance trends, application work load and capacity parameters — are mostly detailed, low-level specifications.

Second, as described by Stack and Tweedy, the methodology seems to concentrate on the hardware dimension. Data base distribution and system control are pushed well into the background. Many distribution decisions must already be made in order to specify the application work load as an input.

Third, the methodology does not suggest new system configurations. It can only analyze those suggested by the designer, and it can not yet analyze the important class of horizontally distributed systems.

Fourth, the authors present no taxonomy for functions that is independent of predefined hardware architectures. No techniques are described for analyzing functions independent of the architectural primitives.

(Continued on In Depth/12)

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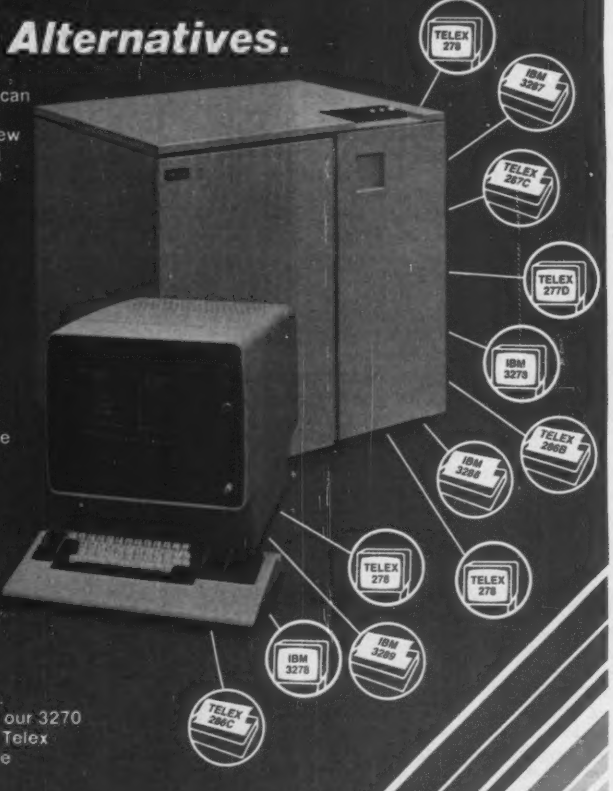

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IN DEPTH

(Continued from In Depth/11)

The best methodology is not always linear. For the foreseeable future, even the best design and development methodologies will not be able to guarantee an optimum DCS on the first try.

Hodgson reminds us that, because a DCS design has so many degrees of freedom, even a small mistake at an early stage of design can preclude the achievement of important system requirements [Hodg76]. He proposes a three-step design approach: analysis; first-shot, hypothetical solution; solution tuning. As Wenig puts it, "Experience is the only valid teacher" in learning to design and operate a DCS [Weni79].

So this section on design methodology closes by reviewing two papers that closely examine the idea that, as Becker suggested, design and development must be an iterative process [Beck76]. The first paper discusses why the traditional, methodical engineering approach works poorly [Shif78]. The second discusses some alternative approaches [Ball77].

Faulty Assumptions?

Traditional methodology may depend on faulty assumptions. The paper by Shifflett, Hofland and Schultz "addresses and questions the fundamental theories inherent in the traditional way in which large, complex software systems have been built." The authors claim that the traditional approach to getting technical work done makes four commonly accepted assumptions. They argue that these assumptions are incorrect for software systems, and they propose a new approach that views the development of large-scale systems as experimental in nature. This section summarizes their views.

Four commonly accepted convictions are inherent in software development or have arisen from it:

- **State-of-the-Art Assumption.** "Nearly all new software systems to be developed are within the state of the art and are, therefore, production rather than experimental efforts."

If a complex system were not experimental, it could be bought off the shelf rather than built from scratch. The history of cost and schedule overruns in the computing industry show that nearly every big system is unique and that the state-of-the-art assumption is invalid.

- **Detailed Requirements Assumption.** "Requirements should be defined and documented in detail before proceeding with design and implementation, and design must be fully specified before the start of coding and testing."

For a large system, complete prior specification is impossible for three reasons. First, end users only understand their current situation and can't imagine how work will be changed by a new system. Second, accurate quantification of many requirements must await completion and measurement of the new system. Third, requirements are not static; Becker calls this the "vanishing problem" syndrome [Beck78].

- **Positive Control Assumption.** "Large complex software systems can be managed and controlled by traditional methods of defining activities in advance, making detailed schedules and budgets and carefully monitoring progress."

It follows from the foregoing points that this is naive. "No one can successfully manage a group of people engaged in trying to do impossible tasks."

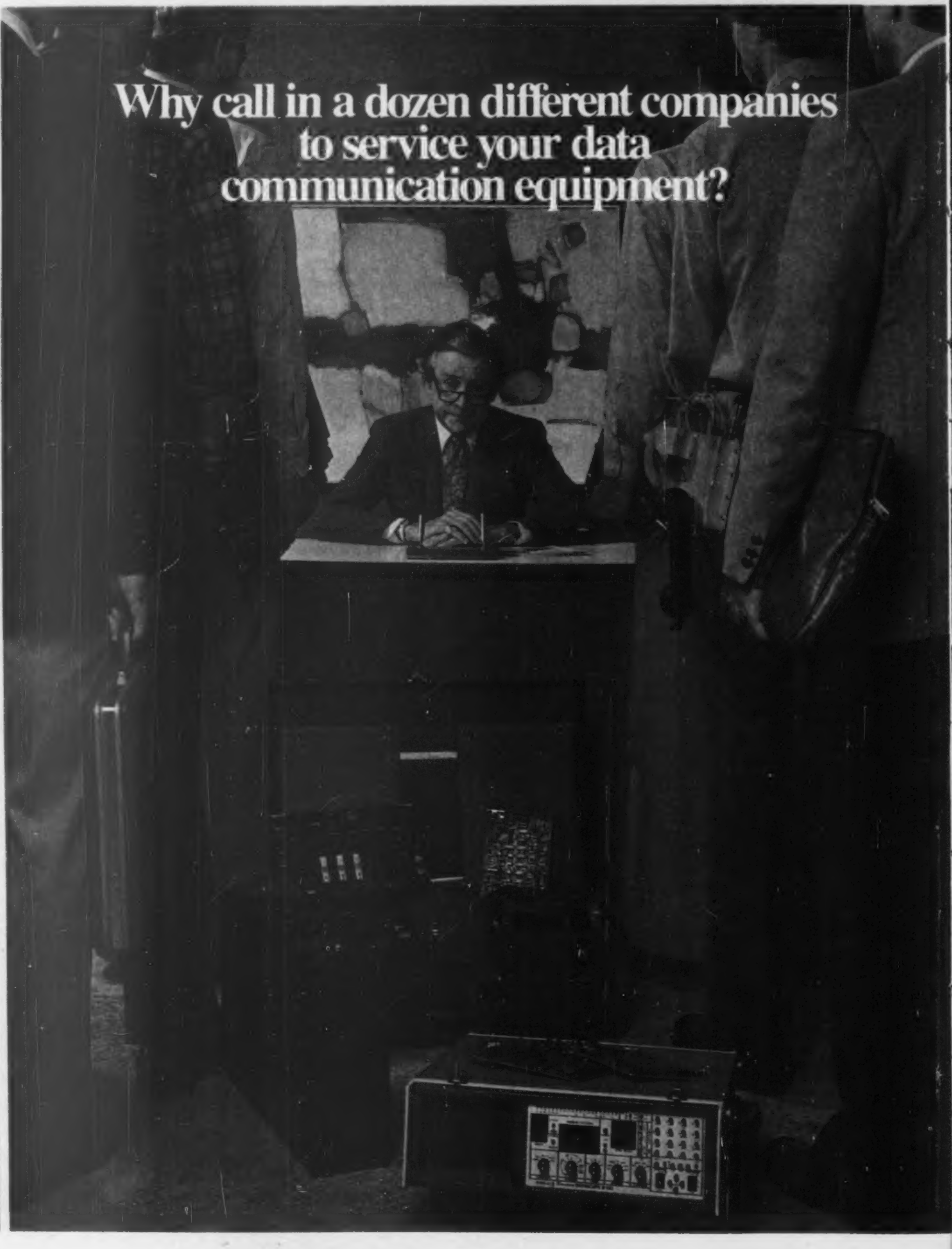
- **Bell-Shaped Staffing Assumption.** "The way to staff such [large, complex software] projects is to aim for a bell-shaped curve covering the definition, design, implementation and testing activities."

This staffing scheme leads to early compartmentalization as the management pyramid builds upward, which fragments the design and inhibits communication. The people added at the peak work inefficiently because they don't understand the design rationale. Hence, the curve never can turn down again until the project is almost over.

Alternate Method

To replace the traditional approaches based on these four assumptions, the authors propose an iterative, three-phase process.

1) *Skeletal System Phase.* This phase includes definition, design and limited implementation, and they are done concurrently and iteratively. Specifica-



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tions are constantly revised as needed in cooperation with end users. This phase produces:

- A detailed functional specification in terms understood by end users and managers.
- A working skeletal system that provides a solid base for further development.
- A schedule and cost estimate for completion, supported by a risk analysis and based on experience with the skeleton.

At the end of this limited implementation phase, management can decide whether to continue and to commit to major expenditures.

2) Operational System Phase. This phase would implement the final design from the first phase, complete all documentation, install the system and begin production operation.

3) Maintenance Phase. This phase would be strictly limited to corrections and enhancements. It "would not include doing the system over to make it work as it was supposed to" as often happens under the traditional approach.

This iterative three-phase process is not always superior to the traditional one-pass process. Sometimes all the key decisions can be made correctly at the times they are needed in the design and development sequence. Nor is this proposed process the only alternative to the traditional one. Others are in use.

Trial and error may be necessary. Bally, Brittan and Wagner outline four different strategies they call the linear strategy, the loopy linear strategy, the plug-in strategy and the prototype strategy. All four use the same nine steps in the same sequential order, but they differ in how steps are repeated. The nine steps are:

1) **Conception.** Make initial project proposal.

2) **Study.** Review feasibility, costs and benefits.

3) **Definition.** Establish requirements.

4) **Analysis.** Investigate alternatives in detail.

5) **Design.** Specify a system.

6) **Implementation.** Build to specifications.

7) **Testing.** Test the system in a trial environment.

8) **Acceptance.** Install the system in actual conditions.

9) **Operation.** Run the system in production mode.

The *linear strategy* assumes each step is done once in the order given. Minor looping is allowed in the early stages, but extensive looping implies unsatisfactory deficiencies in those stages. The linear strategy seldom works well unless the developers have experience with similar systems and the users correctly understand their own needs.

The *loopy linear strategy* proceeds in a series of haphazard and short-term loops. This strategy is the unintended result of attempting a linear approach. It occurs when user requirements change often or when testing reveals design inadequacies. Any project will have and can stand some loops. But excessive looping overruns schedules and budgets and creates conflict between developers and users.

The *plug-in strategy* proceeds linearly from conception through analysis, creating a general design divided into subsystems. Then the subsystems are completed sequentially; each subsystem is taken from analysis to operation before the next is begun.

The *prototype strategy* completes the conception and study steps for the whole system, but then activity is scaled down.

Requirements are defined for a simplified prototype rather than the entire intended system. That prototype is then taken through the rest of the steps and into operation. When enough experience has been gained running the prototype, the steps from definition through operation are re-

(Continued on In Depth/16)

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IN DEPTH

(Continued from In Depth/13)

peated for a second, revised or expanded prototype. The cycle repeats until a full system emerges.

Some Disadvantages

The prototype strategy also has disadvantages. First, it appears to cost more than the linear or plug-in strategies. But the risk is that one of those can turn into a loopy strategy that costs far more than building prototypes.

Second, the incompleteness, simplicity or reduced scale of a prototype might cause it to operate in a very different way from that of a full-scale system of the same design. So incorrect design inferences might be made.

The authors emphasize the prototype strategy because it is less widely used than the others and because it has important advantages. It copes well in fluid situations. It avoids getting bogged down in the early steps if information is hard to get. Third, it generates user confidence because users can adjust to change gradually and are not forced into big, high-risk decisions.

Most Important Plus

The authors believe this third advantage is the most important because "any information processing system must achieve both 'technical' and 'psychological' success." These are defined as follows:

- **Technical Success.** "The degree to which the actual performance of the system matches its specifications."
- **Psychological Success.** "The degree to which the end user has confidence in the final system." Technical success is necessary but not sufficient for psychological success.

With the mention of psychological success vs. technical success, this series returns to its central theme: the need for cooperation between general managers and computing technicians during DCS design and construction. What general managers should know about distributed computing is that they can't build a DCS without computing technicians.

What computing technicians should know is that without general management guidance, their DCS may turn out to be only a laboratory success serving no useful organizational purpose.

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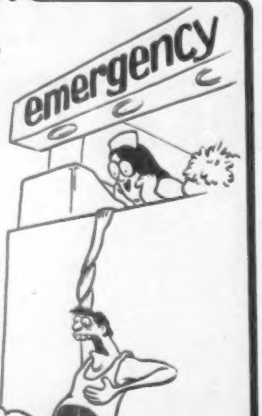

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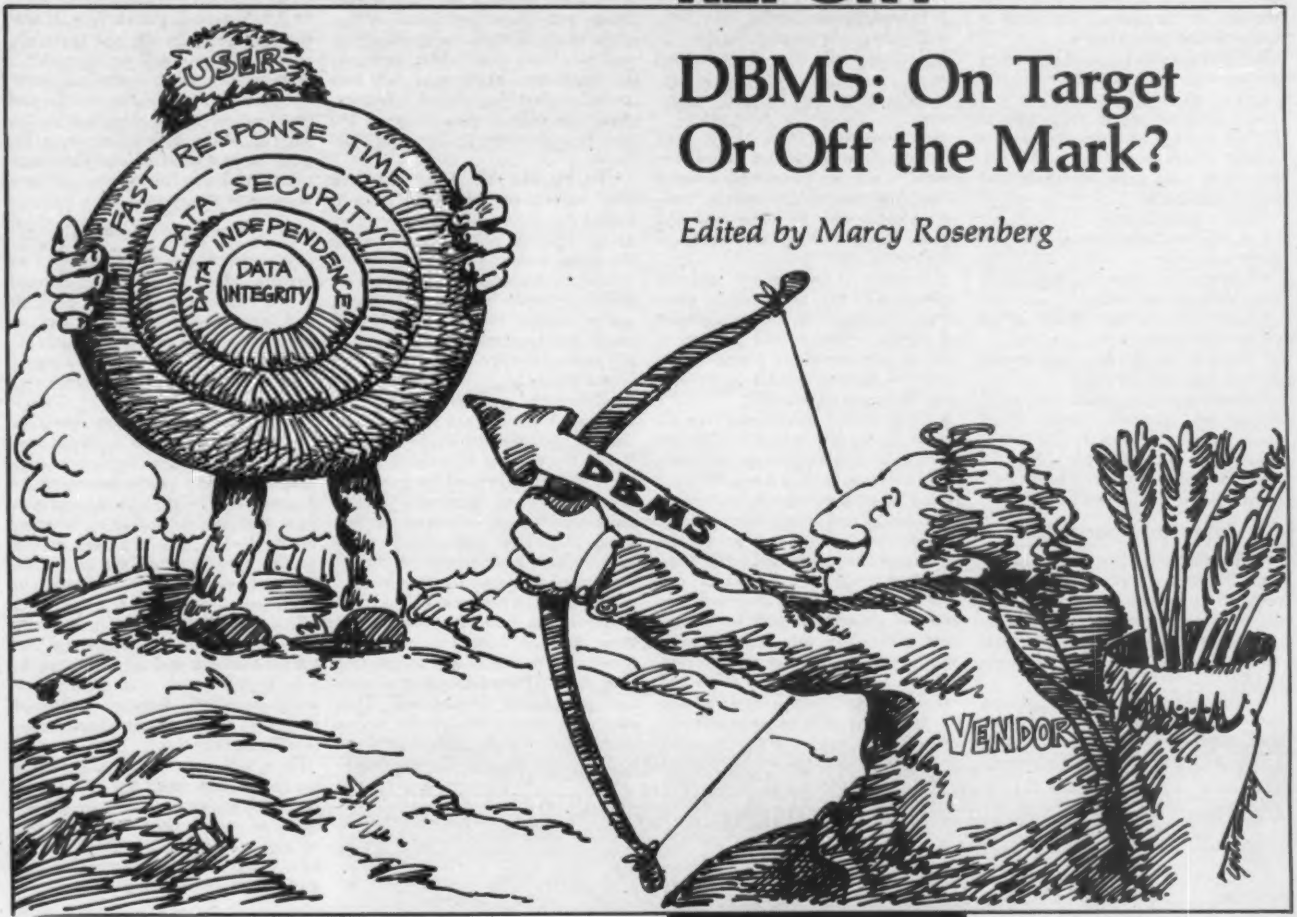
DBMS: On Target Or Off the Mark?

Edited by Marcy Rosenberg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As Many Failures as Successes

Basic Facts About DBMS Separated From Fancy

By Yale S. Landsberg
Special to CW

By now, thousands of companies have installed a data base management system (DBMS) and each year, hundreds more begin considering this new mode of data organization and usage. Yet any impartial examination of the results shows as many notable disappointments as successes.

When data base projects bog down or fall short of expectations, usually the DBMS and the DP professionals involved get the blame. Some of these disappointments may indeed be caused by errors in DBMS selection, poorly thought out implementation plans or undertrained project teams.

But we have also found that the very assumptions about data base technology and use which most people now take for granted may actually put both DBMS package and implementer at a serious disadvantage and make ultimate data base goals unrealistic and even unattainable.

These assumptions are:

- Accept the high costs and risks of going data base.
- Perform an expensive, well-documented corporate study.
- Select the one best DBMS for all company requirements.
- Phase in the data base over several years in well defined stages.

If this viewpoint — which attempts to answer the question, "How to go about building a corporate data base?" — has proved to be a limiting factor for many companies, is there a realistic alternative? We think there is.

Short-Term Orientation

By inverting this question to ask instead, "Where to apply data base technology to overcome conventional DP deficiencies?" a more controllable, short-term orientation emerges that does not necessarily have to be short-sighted.

This broader and deeper view of data base technology as a set of diverse tools has the potential for transforming the data base administration function along lines envisioned for data administration.

It gives companies the freedom to apply DBMS products more flexibly and so tailor individual data base solutions to the diverse centralized, stand-alone and distributed DP problems that exist in the real world.

Data Base Requirements

We believe companies should consider using data base technology instead of conventional approaches any time there are requirements for:

- Extremely automatic and efficient
- Unified management of
- Potentially very large
- Highly accessible and sharable
- Evolving collections of interrelated records
- Stored without harmful redundancy.

By examining this long and seemingly convoluted set of requirements, a number of valuable insights about this view of data base technology become easy to understand and apply. Taken one by one, these requirements are:

- *Records.* Contrary to popular opinion, data base technology is principally involved with the management of records — logical and physical — and not with individual pieces of data somehow floating around in the data base waiting to be accessed.
- *Collections of interrelated records.* While file usually means a collection of records of a single type or form, data bases may contain many different record types, some directly and others indirectly related to each other.
- *Evolving collections.* Part of the advantage of storing data in data bases is that this type of organization can support different kinds of growth. For example, growth can occur in the data base, itself — new data elements, additional record types and relationships between types — or in the needs and variety of applications — new views of the data using different keys and sort sequences.
- *Stored without harmful redundancy.* Having the same data stored in different places can cause different problems — first, extra storage costs and, second, the often more embarrassing problem of inconsistent reporting. The same data stored in several files is likely to be out of sync due to differences in update schedules.
- *Highly accessible.* When stored in a true data base organization, data must be highly accessible for a number of different purposes. Consequently, it is normally assumed that the data base is stored on direct-access devices, usually disk.

With the development of multikey Isams and interactive report writers, some of the distinctions between files and data bases tend to blur, especially for beginners. Yet from a data base point of view, high-speed access extends not only to data retrieval, but also to high-speed updates and deletions.

- *Highly sharable.* Data stored in data bases potentially may be processed by many different users in many different ways, possibly all at the same time. Consequently, certain functions are needed to support the especially complex and varied accessing and enqueuing inherent in data base usage. Conventional file structures do not generally support a very high level of sharability.
- *Potentially very large.* When collections of records are small, a data base organization may not be required. But as the number of records, record types and interrelationships grows, the once simple and acceptable performance can become extremely cumbersome. Data base organizations with their support technologies fill the access speed and resource management gaps left by conventional methods.
- *Extremely automatic.* As applications and data management requirements increase in size and complexity, program and file maintenance costs often limit future development. Data base technology provides cost saving mechanisms — for example, logical and physical data independence for automatically supporting additions and changes to the data base as applications evolve, without requiring changes to other existing programs.
- *Extremely efficient.* As applications requirements increase for faster response and turnaround times and as management pressures grow for more productive use of personnel and equipment resources, data base provisions for making optimal use of designer, programmer and user time gain in importance. Such provisions include tuning aids, high-level languages, ad hoc facilities and best use of CPU, memory, I/O and disk.
- *Unified management.* True DBMS' manage access, buffer and space, directory, security and recovery functions on a unified, centralized basis. The results are economies of scale and coordination needed to support the often conflicting and incongruous requirements typical of complex management information systems and line-oriented applications.

No Inherent Conflict

This data base view doesn't *inherently* conflict with the old concept of the single corporate data base. In fact, when the set of potential applications grows large enough, it closely resembles the requirements for a single corporate data base managed by a single corporate DBMS.

However, differences between these two views arise out of problems that occur when trying to implement data bases that go beyond the natural boundaries of the DBMS package and data base administration (DBA) function involved. The new approach merely accepts these natural boundaries the way architecture and engineering do in the physical world.

This way of looking at potentially multiple DBMS acquisitions and implementations is analogous to using alloys to give metals extra strength or using differently designed multistage rockets to overcome weight and structural limitations.

There is no longer any valid reason for those who opted for using data base technology on a down-sized instead of a corporate basis to feel ashamed of not using a DBMS properly — especially if enough of the above requirements dictated its use.

Years ago, a prominent pioneer in data base consulting very aptly described a data base as a growing community of data shared by a growing community of users.

Today, however, it is becoming increasingly apparent that this growing community of data shared by a growing community of users may at times be best managed by a growing community of central and local DBA functions using a growing community of mainframe- and minicomputer-based DBMS products.

Sticking to traditional DBMS acquisition and usage concepts for the sake of neatness, then, will only continue to cause unneccessary data base failures and disappointments to occur with greater frequency and losses.

Landsberg is president and principal consultant for Omnibase Corp., a data base research and development firm in Palisades Park, N.J.

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Most Talked About, Misunderstood Topic

Definitions Needed for Understanding DBMS

By V. Venkatakrishnan
Special to CW

What is the one topic that is tossed around most either at DP management or technical circles? The answer is a combination of any of the words in the string, "data base management system" (DBMS).

There are several reasons for this — both technical and philosophical. First, the technical.

A few years ago I attempted to characterize a DBMS [CW, May 8, 1978]. The rather nebulous use of the term has contributed to misconceptions as to the very nature of what a data base is or should be. The multitude of software products with the label "DBMS" has not helped either.

One disturbing consequence of such misconceptions is the exacerbation of the communication among DP personnel at all levels. And communication with the legendary end-user has been frustrating partly because of communication problems among DP people themselves.

The scope of this article, then, is to:

- Define access method (AM), file management system (FMS) and DBMS in unambiguous terms.
- Emphasize the roles played by each of the above in the management information system (MIS) environment.
- Try to find a harmony in the chronology of information evolution.
- Do all of the above in a way that both technical and managerial personnel can relate to and agree upon.

File access has been known from the time homo sapiens learned to read and write. The data set was probably a set of characters inscribed on a scroll, capable of being understood by a select group of learned men who interpreted it to emperors and commoners. Note that all the elements of an access method were present, although in a primitive manual form.

In more modern times, any system function has three basic components — input, process and output. Functionally, two-thirds of these components — input and output — are performed by access methods, without which there can be no meaningful interaction between the computer and the external world. Also, certain types of access methods demand specific data storage organizations while others may be more forgiving.

The formal definition of an access method is, then, a technique for *physically* organizing data sets and transferring data between storage in computer (core) and an external medium.

A few examples of AM are Bsam, Isam, Qsam and Vsam. Some AM, such as Vsam, may have more capabilities than simpler ones, such as Qsam. The role of AM in the MIS environment is depicted in Figure 1.

The goal, of FMS is to provide the user with a tool more powerful and compact than the commonly known programming languages. Some commercially available FMS are easily usable by non-DP end users for simple applications. In general, they are not suitable for designing large production systems. FMS may be procedural or nonprocedural (query).

We can define FMS as follows: It is a self-contained system capable of performing a number of straightforward processing and maintenance tasks relating to *physical* files.

Example of FMS are Culprit, Easytrieve, Mark IV and RPG. The place of FMS in MIS is shown in Figure 2.

Just what is a data base? In its simplest generic form, the term is often used to denote any collection of physical data records — disk, tape, box of punched cards or even a ledger! However, it is this interpretation that leads to confusion even among professionals.

The term, data base, is to be reserved for that collection of data records which lends itself to being manipulated by tools designed to manage data as a corporate resource. This implies that a data base must:

- Support elimination of unplanned redundancy.
- Support minimization of program/data dependence.
- Support relationships between its various components.

The third characteristic is known as logical relations — typically a many-to-many relationship that is required in a surprisingly large number of instances.

Consider the situation where we want to locate a book in a local library that is not yet automated. The approximate title is known so we find it by searching through the Subject Index stack. After glancing through the book we find it absorbing enough to want to read other books written by the same author. Fortunately, there is the Author Index stack that gives precisely this information. We have thus manually established a logical relation between Subject Index file and Author

(Continued on SR/4)

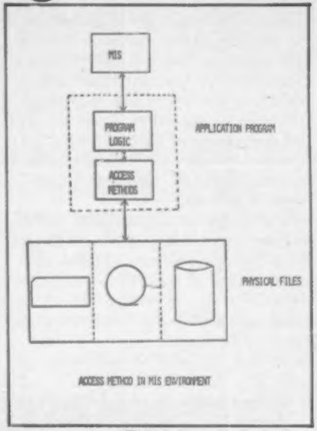

Figure 1

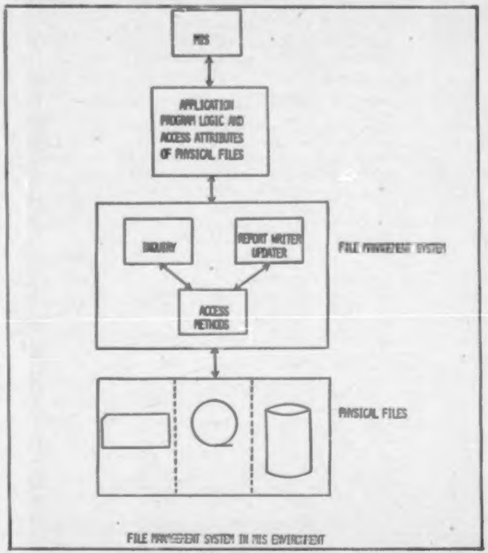
MIS
APPLICATION PROGRAM LOGIC AND ACCESS ATTRIBUTES OF PHYSICAL FILES
INQUIRY
REPORT WRITER UPDATER
ACCESS METHODS
FILE MANAGEMENT SYSTEM
PHYSICAL FILES
FILE MANAGEMENT SYSTEM IN MIS ENVIRONMENT

Figure 2

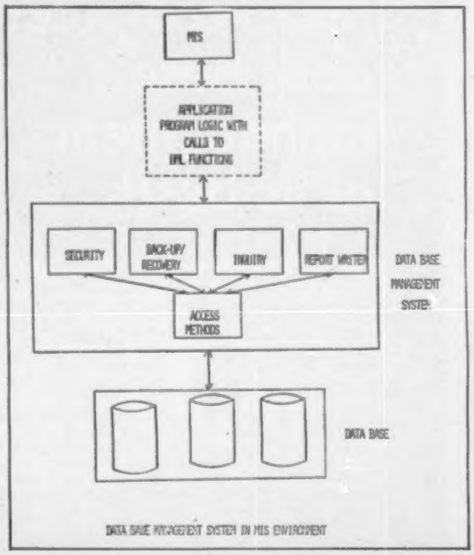
MIS
APPLICATION PROGRAM LOGIC WITH CALLS TO DML FUNCTIONS
SECURITY
BACK-UP/ RECOVERY
INQUIRY
REPORT WRITER
ACCESS METHODS
DATA BASE MANAGEMENT SYSTEM
DATA BASE
DATA BASE MANAGEMENT SYSTEM IN MIS ENVIRONMENT

Figure 3

DECsystem-10 DECsystem-20

DPL

data processing language

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DPL IS MORE THAN A DBMS or query language. DPL is a total data base environment; complete, precise, yet easy to use. DPL is a non-procedural English programming language which models data processing applications. Thus, DPL reduces development time by up to 75%. Programmers are using DPL for large systems, and managers turn to DPL for reporting or query. DPL, an ICP award winner, is truly the data base technology of the future.

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DBMS: Tossed-Around Topic Needs Definitions

(Continued from SR/3)

Index file.

Data bases must provide for automating the logical relations through appropriate software (DBMS). Hence, the following succinct definition of DBMS: It is a system that provides facilities for organization, access, control and monitoring of the data base whose components may be logically related but are distinctly different from its physical data set.

Some commercially available DBMS software are Adabas, IDMS, IMS and Total. There are different philosophies in the design of a DBMS — network, hierarchical or relational. The relational approach deserves special attention for two reasons:

- It led to the development of implementation-independent data base analysis, which is absolutely necessary if data bases are to live up to their expectations.
- It led to the development of backend data base machines. These are hardware/software combination DBMS and are designed for the specific purpose of efficient data base handling. They can be backended to a variety of large and small host systems. One example of a commercially available data base machine is the Britton-Lee Intelligent Database Machine (IDM). Data base machines have great future potential.

CHARACTERISTIC	AM	FMS	DBMS
DATA COMPRESSION	MAY BE	MAY BE	YES
DATA INDEPENDENCE	NO	NO	YES
DATA INTEGRITY SAFEGUARDS	SOME	SOME	YES
COMPREHENSIVE SECURITY FEATURES	NO	NO	YES
SUPPORT NONUNIQUE KEYS	PARTIAL	PARTIAL	YES
LOGICAL VIEW OF DATA	NO	NO	YES
LOGICALLY RELATING COMPONENTS	NO	NO	YES
INTEGRATED EDIT FEATURES	NO	MAY BE	YES
INTERACTIVE QUERY FACILITY	MAY BE	MAY BE	YES
SUPPORT CENTRALIZED DATA MANAGEMENT	NO	NO	YES

Figure 4: Differences Between AM, FMS, DBMS

A DBMS usually has other features such as security, utilities and query. How DBMS fits into the MIS environment is shown in Figure 3. Figure 4 is a table comparing AM, FMS and DBMS. The contents of this table may be paraphrased as follows:

Information has two attributes — a quantity attribute characterized by volume, completeness and accessibility, and a quality attribute characterized by timeliness, relevance, accuracy, availability, reliability and flexibility. The basic difference between AM, FMS and DBMS is the extent to which these attributes are satisfied.

Now for the philosophical reasons for interest in DBMS. The question of whether AM, FMS, DBMS or a combination is to be used for a given application can be approached rationally if there are no guidelines in the installation. Admittedly, the DBMS is the most complex and expensive to maintain. But, for a variety of reasons, such as long range benefits and on-line requirements, there is an increasing tendency toward expanding the use of DBMS.

The real benefits, even the long-range ones, of DBMS can be realized only through efficient enforcement of well-defined data administration policies and procedures. As has been said so often, this requires a durable commitment by senior management. At the same time the need for the existence of a sound technical infrastructure cannot be overemphasized.

In the absence of such a commitment and the technical infrastructure, the use of DBMS degrades it into an expensive version of AM and can hardly be cost-justified.

As a final note, what does the transition from AM to FMS to DBMS signify other than technological achievement? To me, it reflects the human being's unending craving for freedom and individuality.

Venkatakrishnan is software adviser, data base/data administration, for Aetna Life & Casualty in Hartford, Conn.

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- non-redundancy of data, easy updating
- occurrences of a record type may own other occurrences of the same type
- a single set may have multiple owner and member record types

MDBS-DRS. As an add-on to MDBS, the DRS system offers extraordinary flexibility in data base restructuring to meet new needs.
- Item, record, and set types can be added, deleted, or renamed in an existing data base as well as other data base characteristics. You can redesign the data base after it is already on-line!

MDBS-RTL. As an add-on to MDBS, the RTL (Recovery Transaction Logging) logs all data base transactions, so that in the event of a system failure, the data base can be recovered with minimal loss of information.
- The recovery processor permits selective reloading of the data base from the transaction file. Users can log messages, indicate complex transaction sequences, and effect selective control over the recovery process.

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In Data Base Environment

Do-It-Yourself Applications the Best Solution

By Leo J. Cohen
Special to CW

Have you heard vendors use these lines: "All you have to do is install our application package and you'll have your application running under data base in two months"?

Or, "With our application package, implementing your payroll as a data base system is a snap"?

Or, "Our data base system application package lets you knock off inventory management in no time flat — and best of all, *you don't even have to know anything about data base.*"

When you hear them, alarm bells ought to go off in your head.

Reading ads and listening to vendors, I sometimes get the feeling that the primary function of DP is to pay for the computer and keep it dusted. In my view, even in these days of modern whiz-bang EDP and data based DP, there's still no such thing as a free lunch. There are no easy routes to data base success, packaged data base systems included.

Package Limitations

The vendor of a data base application program package starts out by identifying an industry and an application area within it for which a worthwhile market seems to exist. The vendor then develops a system that satisfies a statement of requirements for that particular application area across that industry in general.

However, since the breadth of the market is of paramount importance to the vendor, the requirements statement on which the system is built is often strong on generality, but weak on detail. The vendor tries to hide the complexity of the problem environment by covering it with a basketful of DP gimmickry: on-line this and that; interactive, open-ended, user-friendly everything and complete data base organization and support.

Nowadays, the sale of such applications packages depends so much on whether they "run under data base" that if they don't they're obsolete even before their ads hit the papers. But building *any* application "to run under data base" is suspect, commercial applications packages not excepted.

After all, the application "problem" as defined by the vendor does not account for problems that the prospective purchaser may have in other areas. For example, there can be little or no planning for interfaces to other systems.

In other words, the data base architecture prepared by the vendor as its solution to the application requirements will be relatively inaccessible to the non-data base systems of the client's environment, should those systems be interested in the package's data base data.

The vendor does, of course, face the legitimate problem of maximizing performance in the general application system it is building. Experience has shown that much of the performance of data base systems depends on architectural structuring. As a consequence, the vendor's architecture is suited to performance achievement in the application problem as the vendor has perceived it.

Furthermore, the vendor structures its application programs so that they use the data base in the optimal manner.

Up Against Problems

But this is where we run into problems, because the application programs are heavily vested with the architecture of the data base. This means that even light tinkering with the data base architecture by the client's DP organization can have quake-like effects throughout the vendor's application system.

This is wholly unacceptable for a variety of reasons, not the least of which is that packaged software is supposed to be maintenance-free, at least for the client DP organization.

In any case, the result of the vendor's efforts is to produce a stand-alone application system. Its data base does not interface readily with anything outside of it, meaning that the data it contains is relatively inaccessible. Since you dare not change the architecture, the only way to access the data is by brute-force spin-off. The packaged system becomes a stand-alone system, but only in the worst sense.

This message often gets hammered home when the client authorizes an enhancement in the purchased data base system. Because of the architectural dependence of the application programs, such operations often cause bleeding far beyond the doctor's prognosis.

In-House Route

The purchase of a data base-interfaced application program package for some particular business area might seem at first glance to be straightforward, logical and, above all, efficient; by contrast, building an in-house application system for that functional area appears to be difficult, expensive and, above all, dangerous. Managers often perceive immense risks associated with the in-house route, and the fact that that translates into potentially deadly personal possibilities does not escape them.

Unfortunately, many such managers have never been down the road of package acquisition, installation, operation and maintenance. They see the dangers of the in-house route looming large and inevitable. What they don't realize is that the lack of a complete requirements statement from the end user — what the in-house route can offer and what the vendor does *not* have in building its package — is an even bigger risk.

All the choices the designer makes for a data base architecture come from one of two places — his imagination or an end-user requirements statement. The former we can dismiss, since we know it to have a dismal track record in implementing effective systems.

The latter — gathering requirements from end users — is a necessarily large effort, but the rewards are large as well. The key ingredient is that the users' voice has been heard. That is what's often ultimately missing in the packaged data base application systems.

How Much Commonality?

The basic premise of the data based application package industry is that primary business functions in a particular industry are essentially standard or, if not, subject to standardization through DP measures. Indeed, it is certainly the case, for example, that all banks have common major functions. After all, all banks handle demand deposit accounts, savings, mortgages and small loans.

In this basic functional sense, one can certainly allow that "a bank is a bank is a bank," and this also holds true for many other industries.

But how deep does this commonality really go? Two points of variance can be easily spotted. First, when you decompose the allegedly "common" functions into detailed subfunctions, you will inevitably find significant differences between any two given corporate environments.

In other words, the specific roles and responsibilities defined by the functional decomposition for, say, mortgage loans in one bank, will show significant variation in their detailed definition from those of the supposedly common function "mortgage loans" in a second bank.

Second, the organizational structure which contains the so-called common functions and their procedures will be inevitably different. Since the detailed decomposition of functions maps onto the organizational chart in any definition of how an organization's procedures are carried out, this second source of divergence has a multiplicative effect — rather than simply an additive one — in increasing the functional variation between two companies of the same industry. In other words, at the detailed level, "a bank is *not* a bank is *not* a bank."

What are the implications for DP? For some time we have known that the pillars of a requirements statement for a data based system are information, organization and function. ("Function" defines *what* is done' "organization" defines *who* does it and "information" defines what *data types* are needed to accomplish it.)

Now if a major function of a given enterprise is done differently in its detailed subfunctions across each company that pursues that "common" enterprise — *and* if each company has its own particular organizational structure to carry out those subfunctions — then even though the data types in the requirements/-statement for the enterprise might be the same for each company will be very different.

Not Close Enough

What this really says is that the requirements statement for a data based system is a direct reflection of the nature, personality and working efficiencies of the organization. Like it or not, the requirements statement that is produced by the vendor of a data based application package hasn't any hope of coming within a mile of what the statement *should* look like for a particular company.

The strongest attraction of the package approach is that it seem so easy. Installation is merely a matter of writing a check. The vendor provides training. Lead time is next to zero. But is all this glitter really gold?

Invariably, the outputs and services that anybody's DP system delivers must be modified. No system is perfect — and, if we indulge ourselves a little, even if it *were* perfect, users still wouldn't be completely satisfied.

So we must change a system that we either build or buy. If we are the ones that built it, then certainly we know how to change it. If we bought it, we must learn how to change it so as to avoid disastrous consequences. Besides the fact that venturing into vendor software is a peril-laden and essentially illogical action, there is the unavoidable fact that if you *do* try to change it, the architectural inertia of the system will put formidable

(Continued on SR/8)

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Data Base Potential Wasted by Poor Planning

By Richard C. Perkinson
Special to CW

It is data base technology that will make it possible for management to tap the total data resources of an organization. However, the problem is that data base has not yet lived up to its potential.

In most organizations, data base is only used to automate existing systems, incurring, as a result, all of the overhead, but not producing 100% of the benefits. At this point, data base is being used as nothing more than a glorified access method.

Here's an appropriate analogy. One would never consider designing a railroad without a plan — one would never lay a track here, a track there, nor build a station without first determining the paths from place to place and the natural population centers.

However, DP professionals have been laying track all over the landscape. When we require communication from one track (system) to another, we must hope we do not encounter a river gorge or mountain range requiring elaborate bridge building or extensive tunnel blasting. It is essential, then, to anticipate future changes and incorporate them into current design.

Departmental Subsets

Each functional area in an organization operates with a subset of the total data resources of that organization. Different departments require different versions of the same data. For example, the sales department, the manufacturing department and the accounts department may all require information regarding each customer order.

But while each department requires specific information relating to that order, other order information may be universally required by all departments. Data redundancy results when the same data exists in different functional versions used by different departments.

One problem is synchronization of data. If the manufacturing department changes the design of a product, this information is of interest to all other departments. What are the changes in materials? What are the costs? How will the change affect sales? Each department's subset of information must be updated in order for the impact of a change to be reflected throughout the organization.

Functional Separation

Functional separation of data creates another problem. While it is fine for individual departments to function with subsets of information, it is imperative that management have access to a broader spectrum of data from which to make its decisions.

From an operational standpoint, an organization may handle this data flow well. However, raw data is not information. Information is data combined in logically arranged groups. Birthdates, names, addresses and employee numbers are data, but a matched set of birthdate, name, address and employee number is information. Thus, if data resides in separate files it cannot become useful until it is combined into an information set.

In general, management requires information summaries of activity in order to make decisions. While the order department may be concerned with the status of a particular order, management is concerned with the status of orders for a week, a month or an entire year.

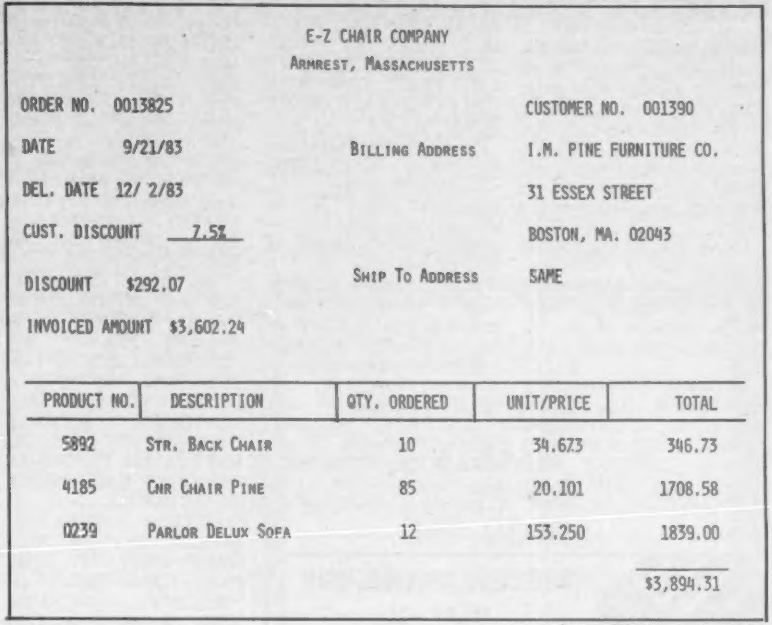
Thus, while subsets of data work well in the functional departments, this separation of data can prevent top management from gaining an overall appreciation of the status of the entire organization.

Data base failures in this regard and the seeming inflexibility of some data base systems are not a technological problem at all. The problem lies in the analysis and design approach designers currently use to implement data base systems.

Data Analysis Solution

Data analysis is the key to establishing a data plan, and the key to data analysis is normalization. What is normalization? It consists of three steps: First, second and third

(Continued on SR/8)



E-Z CHAIR COMPANY
ARMREST, MASSACHUSETTS

ORDER NO. 0013825
DATE 9/21/83
DEL. DATE 12/ 2/83
CUST. DISCOUNT 7.5%
DISCOUNT $292.07
INVOICED AMOUNT $3,602.24

CUSTOMER NO. 001390
BILLING ADDRESS I.M. PINE FURNITURE CO.
31 ESSEX STREET
BOSTON, MA. 02043
SHIP TO ADDRESS SAME

PRODUCT NO.	DESCRIPTION	QTY. ORDERED	UNIT/PRICE	TOTAL
5892	STR. BACK CHAIR	10	34.673	346.73
4185	CHR CHAIR PINE	85	20.101	1708.58
0239	PARLOR DELUX SOFA	12	153.250	1839.00
				$3,894.31

Charts by QED Information Sciences, Inc.

Figure 1

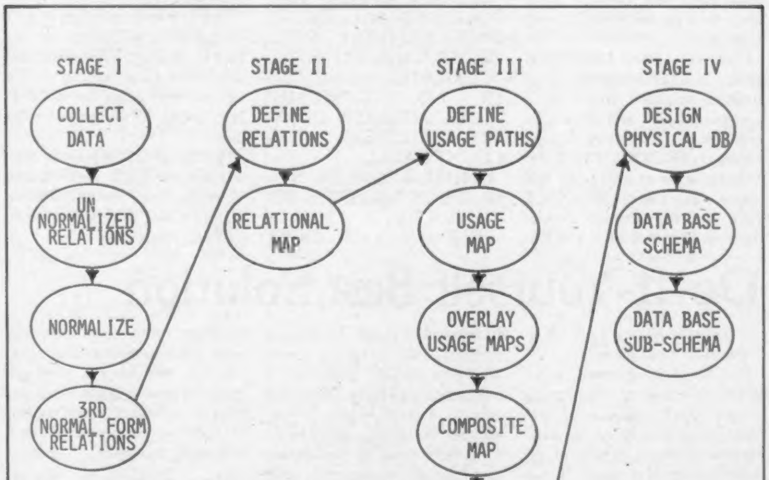
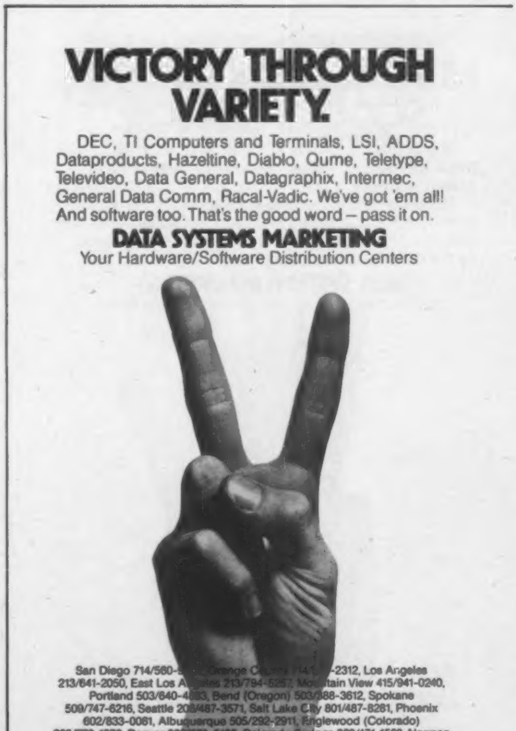


Figure 2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Foresight Keeps DBMS Design on Right Track

(Continued from SR/7)

normal form. Normalization is a step-wise refinement of an entity — a collection of associated fields — into multiple, stable, logical data units. Stable data units promote data independence, are minimally affected by change and are essential to good data base design!

Figure 1 is a sample order form for the E-Z Chair Company. This example provides us with a preliminary order entity consisting of the following unnormalized relations:

ORDER — (ORDER NO., CUSTOMER NO., ORDER DATE, CUSTOMER'S NAME, CUSTOMER ADDRESS, DELIVERY ADDRESS, DELIVERY DATE, *PRODUCT NUMBER, PRODUCT NAME, PRODUCT QUANTITY PRODUCT UNIT PRICE, ORDER SALE PRICE,* CUSTOMER DISCOUNT RATE ORDER TOTAL PRICE.)

The italicized fields are product values which recur throughout the order.

Through analysis of the physical order form we have produced the unnormalized ORDER entity.

FIRST NORMAL FORM requires the identification of repeating groups. Therefore, the first rule of normalization is to remove repeating groups into a new entity.

In this example, we have *PRODUCT NUMBER, PRODUCT NAME, QUANTITY PRICE, TOTAL PRICE* as a separate entity LINEITEM. We must uniquely define each entity occurrence of LINEITEM. PRODUCT NO. alone is not sufficient to uniquely qualify LINEITEM. There is no way to identify the parent order for each product quantity ordered — that is, to differentiate it from other lineitems on other orders. In order to uniquely identify LINEITEM we require a compound key of ORDER NO. and PRODUCT NO.

Thus, the two entities, ORDER and LINEITEM (ORDERED-PRODUCT), can be illustrated as follows:

ORDER: (ORDER NO., CUSTOMER NO., ORDER DATE, CUSTOMER NAME, CUSTOMER ADDRESS, DELIVERY ADDRESS, DELIVERY DATE, CUSTOMER DISCOUNT RATE, ORDER TOTAL PRICE.)

LINEITEM: (ORDER NO., PRODUCT NO., PRODUCT NAME, QUANTITY, UNIT PRICE, TOTAL PRICE.)

SECOND NORMAL FORM, the next step in the normalization process, calls for identifying those attributes which are only partially dependent on the primary or compound key of the entity in which they reside. Thus, the second rule of normalization is to breakout attributes which are only partially dependent on the primary key or primary compound key into a separate entity.

Let's apply this rule to the two entities we have extracted in first normal form. In the ORDER entity, none of the attributes is partially dependent upon the ORDER NO. key; they are all descriptive of this order.

However, the LINEITEM entity is another matter. This ordered-product entity is a compound key, and certain attributes of this entity depend solely on PRODUCT NO. Attributes such as unit price and name describe PRODUCT NO., and they are not dependent on ORDER NO. PRODUCT NAME does not change every time the order changes. Thus, a new entity call PRODUCT results from second normal form analysis as follows:

ORDER: (ORDER NO., CUSTOMER NO., ORDER DATE, CUSTOMER NAME, CUSTOMER ADDRESS, DELIVERY ADDRESS, DELIVERY DATE, CUSTOMER DISCOUNT RATE, ORDER TOTAL PRICE.)

LINEITEM: (ORDER NO., PRODUCT NO., QTY., TOTAL PRICE.)

PRODUCT: (PRODUCT NO., PRODUCT NAME, UNIT PRICE.)

THIRD NORMAL FORM, the last step in normalization, identifies those attributes in an entity which do not depend upon the primary key — whether singular or compound — of that entity, but on some other key within the entity. Thus, the last rule of normalization is to remove attributes wholly dependent upon another key within an entity into another entity.

Attributes not totally dependent on the primary key of the entity in which they reside are "transitory dependents." Customer name, customer address, delivery address and discount rate are totally dependent on the foreign key CUSTOMER NO., not the primary key ORDER NO. Therefore, remove them into a separate entity called CUSTOMER. Third normal form analysis gives us a fully normalized set of entities as follows:

ORDER: (ORDER NO., CUSTOMER NO., ORDER DATE, DELIVERY DATE, ORDER TOTAL PRICE.)

CUSTOMER: (CUSTOMER NO., CUSTOMER NAME, ADDRESS, DELIVERY ADDRESS, DISCOUNT RATE.)

LINEITEM: (ORDER NO., PRODUCT NO., QTY., TOTAL PRICE.)

PRODUCT: (PRODUCT NO., NAME, UNIT PRICE.)

By normalizing the original ORDER entity, we have four stable logical data units. Now if a product price changes, only the PRODUCT entity changes, not every LINEITEM that utilizes that product.

If the customer discount rate changes, update only the CUSTOMER entity instead of every ORDER of that customer.

Normalization is only the first stage in data analysis. Subsequently, the designer can easily link fully normalized entities together using relational mapping techniques, such as Bachman diagrams, to create a logical data model.

Then designers can apply the techniques of usage mapping — transaction analysis — load mapping and load matrix calculation to produce a logical schema suitable for converting the data model into a real data base for any DBMS on the market.

Figure 2 illustrates the remaining three stages. Space does not permit a complete breakdown of the process in this article. However, "The Handbook of Data Analysis and Data Base Design" provides sample forms and design exercises to be carried through to their natural conclusion.

The final point in data analysis and design is to thoroughly document the analysis. Keep the relational and usage maps up-to-date. Be sure to record the business functions and their analysis.

The primary concern in any design is to minimize the effect of change. Therefore, derive the logical structure of a new system from the data itself, using third normal relations.

Perkinson is a principal consultant for QED Information Sciences, Inc., an educational training and publishing firm in Wellesley, Mass.

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Do-It-Yourself Best Solution

(Continued from SR/6)

barriers in your path.

But there is another factor often overlooked. For some reason, the installation of data into the data base of the purchased package is almost always a painful process. It is at least almost always more work, and more time-consuming, than anybody anticipated in the beginning. This is especially true if the package was purchased as a quick means of getting something on the air for a user who has virtually no prior DP experience.

So the big question in installations for this type of user becomes finding data to put into the system in the first place. The data will not be in existing systems, but rather somewhere out in the "field."

Slowly, but surely, corporate managers have begun to recognize that data base offers a long-term road to revamping the way the corporation goes about its data processing.

There is no doubt that the successful data base system project three years down the road makes the DP shop look as if a revolution has occurred. A data resource will have been created; new systems will have been built out of it; expansion of these systems will take place naturally and painlessly; the data dictionary will provide a focal point for definition and control; and perhaps most important, the new systems that emerge from all this will have a homogenous and standardized structure that makes them understandable, maintainable and, above all, *usable*.

These, unfortunately, are results that cannot be purchased.

Let's face it. Anything worth having a real future in the corporation requires deliberate intention, intelligence and discipline. The do-it-yourself route is the only way to get there.

Cohen is principal consultant of Performance Development Corp., a data base consulting firm in Princeton, N.J.

Recipe for Data Base

User Packages Cut System Development Pitfalls

By Harvey M. Weiss
Special to CW

System development failures have been a common event since computers became a part of systems design. The reasons for failure can be traced to a number of factors:

- The average DPer is not fully educated in the system being designed.
- The average DPer considers the system to be only the automated portion of what is being developed. Little concern is given to the total user environment and how the computer portion fits into the total system design.
- The DPer believes the user cannot define system requirements, and so performed this task himself, usually incorrectly.
- When systems development time frames are too long, requirements are likely to change during the development cycle, and thus delay system delivery.
- Many systems are too big to be completed soon enough to be useful before modifications become necessary.
- System flows are often developed that define the systems' components in such an integrated fashion that modifying one component without requiring additional changes to the others becomes impossible.

The question of how to design, develop and implement computer-based systems without running into these problems becomes even more important when a data base management system (DBMS) is involved. DBMS is often considered the solution to a company's information storage needs and developing corporate management information systems (MIS), then, becomes a common project. However, DBMS system devlopment failures also are common and more apparent to everyone since these projects often involve large staffs, many systems and a long delivery cycle.

What is required to successfully develop computer-based data base systems, is the ability to:

- Define user requirements in terms of specific products or services rather than in terms of the sum of these products or services.
- Develop the components of the system separately rather than as a total package of products.
- Coordinate systems development on a product-by-product basis, rather than on a system-by-system basis.

DBA and DA

A step in the right direction came when the DP community identified a new organizational position, the data base administrator (DBA), and a new function, data administration (DA). The DBA assumed the responsibility and the control of corporate data, including its definition and usage. Now, here was an opportunity for DP organizations to use data base technology to view systems development in a new light.

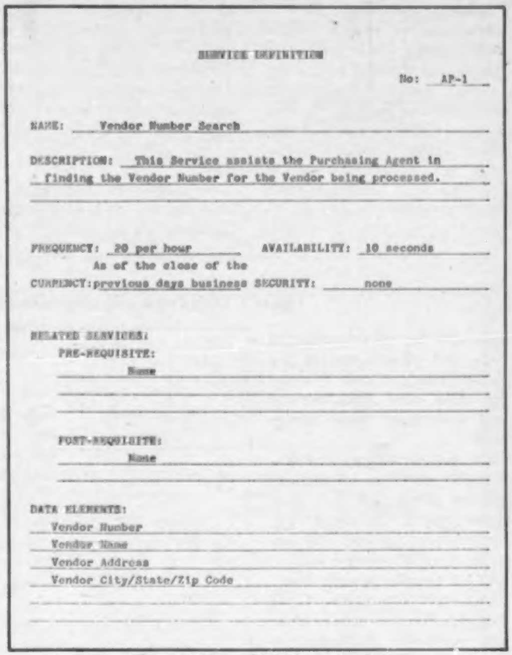
Yet, in many organizations, this position and function was given little, if any, authority to control data or the development process. Further, the person fulfilling the DBA role often brought to the position traditional systems design concepts, and so did not view data base design as anything other than the development of another file access method.

These two factors caused the DBA function to evolve into a passive position — go for data definition but don't control the data base system development process.

Data bases were created by application programmers at will, with little regard for a standard data base development methodology. No visible change to the traditional system development life cycle appeared as data base design projects grew. And the result was an improvement in data control, but not in the crucial area of systems development.

A breakthrough toward improving system development occurred when a methodology was implemented to identify the attributes of each product in a data base system. This process, appropriately, has been called service analysis[1]. Service analysis creates a product that identifies the ultimate deliverable and its at-

(Continued on SR/10)



SERVICE DEFINITION

No: AP-1

NAME: Vendor Number Search

DESCRIPTION: This Service assists the Purchasing Agent in finding the Vendor Number for the Vendor being processed.

FREQUENCY: 20 per hour AVAILABILITY: 10 seconds

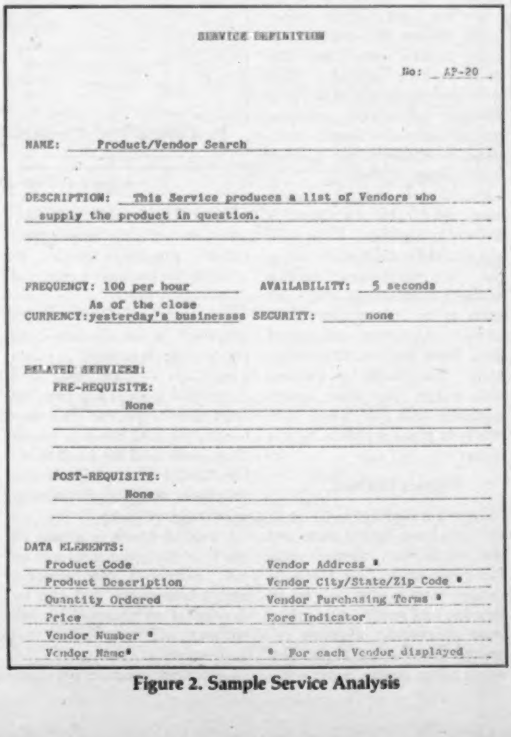
CURRENCY: As of the close of the previous days business SECURITY: none

RELATED SERVICES:
PRE-REQUISITE:
None

POST-REQUISITE:
None

DATA ELEMENTS:
Vendor Number
Vendor Name
Vendor Address
Vendor City/State/Zip Code

Figure 1. Sample Service Analysis



SERVICE DEFINITION

No: AP-20

NAME: Product/Vendor Search

DESCRIPTION: This Service produces a list of Vendors who supply the product in question.

FREQUENCY: 100 per hour AVAILABILITY: 5 seconds

CURRENCY: As of the close yesterday's businesss SECURITY: none

RELATED SERVICES:
PRE-REQUISITE:
None

POST-REQUISITE:
None

DATA ELEMENTS:

Product Code	Vendor Address *
Product Description	Vendor City/State/Zip Code *
Quantity Ordered	Vendor Purchasing Terms *
Price	More Indicator
Vendor Number *	
Vendor Name*	* For each Vendor displayed

Figure 2. Sample Service Analysis

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Packages Top Ingredient of Development Recipe

(Continued from SR/9)

tributes, including:

- Data elements required by the service.
- Estimated volume of the service, in terms of the number of times it will prepare per standard unit of time.
- Estimated time for its delivery (response time), in terms of a standard unit of time.
- Preceding services
- Succeeding services.
- Security, audit and processing characteristics.

Figures 1 and 2 illustrate the types of data obtained during this service analysis effort.

This philosophy allowed the data base system designer to relate the ultimate user requirement to database processing on a product-by-product basis. The significance service analysis had to the system development process was lost, however, because the methodology addressed only the analysis phase. No data base system development plan could be found for implementing services — only for implementing the system in which the services resided.

What is needed, then, is to modify the data administration function to include the service analysis methodology. In addition, the data administrator's job description should reflect the responsiblity for data base development. This would assure that:

- A standardized methodology for data base processing be established and maintained in one group.
- Data base design be centralized also within one group to ensure that system development enhanced rather than hindered the DP facility's ability to meet development schedules and processing requirements.
- Systems as defined under this data base/data processing philosophy not become the cumbersome objects they were under traditional system design philosophies.

User Orientation

The result is a user-oriented data base/data processing methodology whose object is to design and, if necessary, modify the computer-based portion of the total system so that products can be delivered to the user quickly and accurately. To do so requires the following alterations.

A DP organization so designed to meet users' needs is shown in Figure 3. The diagram identifies the systems group as the organization responsible for performing service analysis. The product of this effort, the service analysis document, is then delivered to the data administration group, whose responsibility would be to design the required data base, establish the deliverables and develop the data base access processes.

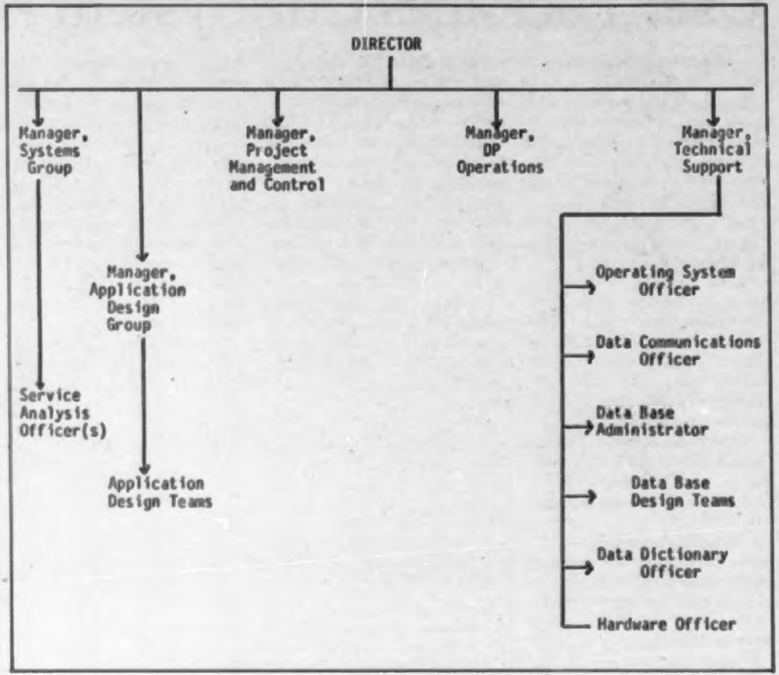

Figure 3. Data Processing Organization Chart

The third group, the application design team, would be responsible for developing the code and procedures for the deliverables, as described by the data base administrator and the data base design teams.

The technical support organization serves as the primary control group for data base development. Technical support will receive user requirements for DP support and direct the systems group to perform service analysis. (This includes the cost/benefit analysis normally performed to determine if automation is justified.)

The technical support group could utilize the expertise it gains in data base, data communications, operating systems and hardware to develop the user deliverable packages. Implementation would then be controlled by the project management group.

An example of such a set of user deliverable packages is shown in Figure 4. The package could be defined by using the data dictionary, service analysis documents and tools such as an information flow analysis document and logical data base architecture document. Knowledge of current data usage, data base access methods and data bases currently in place is critical to this effort

Activity: Accounts Payable*

Package One:	Vendor Inquiry
Services:	Vendor Number Search
	Vendor Identification Search
	Vendor/Product Search
Package Two:	Purchase Order Processing
Services:	Product/Vendor Search
	Purchase Order Inquiry
	Purchase Order Entry
Package Three:	Purchase Payment Processing
Services:	Individual Vendor Payment Request
	Cash Requirements Report
	Check Writing Process
	Check Reconciliation Process

* A partial list of Packages/Services for example purposes only

Figure 4. User-Deliverable Package

Once Defined

Once the package is defined, the data base design team and the application design team can begin work. The data base design team's role will be to develop and modify those data base processing routines required for the package. The application design team's responsibility would be to develop and modify those applications programs needed to process the package's required data.

The fruits of these efforts are, first, a set of data base processing functions — data base calls — developed and controlled by a group familiar with the corporate data elements, the data bases in which they reside and the level of effort needed to implement new processes or changes to meet user requirements.

A second result is a unit of work — the user package — that addresses one specific user requirement and can be developed or changed at will without affecting other requirements or packages.

The third product of these labors is a set of application programs free from the intricacies of the data base processing activity that is developed and controlled by a group familiar with the package's processing requirements and capable of modifying the programs quickly and accurately.

Now with a standard set of data base calls, the technical support group could manage user changes to the data base processing portion of the system, while the application design team could manage user changes to the processing programs.

Weiss is president of Weiss & Associates, a management consulting firm in Aurora, Colo.

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For Tried and True Strategy

Data Base Planning Entails Return to Basics

By Dr. Robert H. Holland
Special to CW

Various well-conceived processes are available for systems planning, but very few exist for data base planning, one of the most critical areas in corporate planning today.

Companies all over the world are struggling with the development of data base plans, and while a few learn to do it correctly and reap great rewards, others fail miserably in their search for the "holy grail."

How, then, can organizations lay the foundation for a tried and true data base planning strategy?

The foundation of both systems and data planning is the business plan. Business planning produces information about the following items:

- Business growth expected.
- Diversification of products and services.
- Reorganization of business functions.
- Acquisitions planned.
- Changes in operating philosophy.

> *'Companies that do not superimpose a data model of the company over their systems plan are throwing money away . . . Many war stories about failures in data base exist in the industry.'*

Any business organization may be generally viewed as depicted in Figure 1. In this diagram all the business functions are represented in the broadest sense. Arrows between the major business functions indicate information flow and dependency between the various functions of business.

Business Systems Planning

Many companies have developed their own business systems planning methodology. Even the mainframe computer vendors have developed such methods to support their clients. IBM, for example, supports its clients through Business Systems Planning.

The major thrust of such methods is to integrate business plans with systems plans in order to generate priorities, schedules and resources required for major systems development efforts. Corporate experience has shown that one serious omission, leading ultimately to operating discrepancies, is the lack of a data model of the corporation. No data model leads to:

- Ill-defined systems projects.
- Fuzzy thinking about data base planning.
- Sets of independent data bases which cannot possibly be integrated.
- Continuous restructuring of data bases and application programs. This is called "maintenance" in most companies, and often comprises 80% of the data processing dollar.
- Isolated applications which cannot be easily combined with others within a reasonable development horizon.

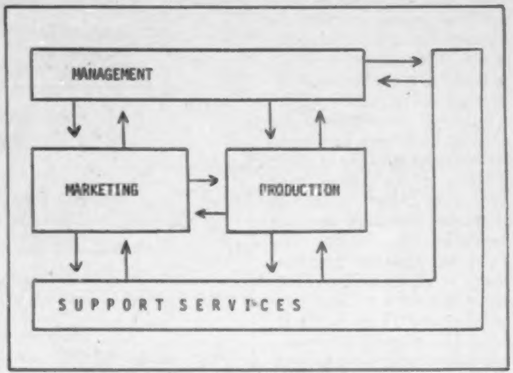
MANAGEMENT
MARKETING
PRODUCTION
SUPPORT SERVICES

Figure 1. Overview of Business Functions

In short, companies that do not superimpose a data model of the company over their systems plan are throwing money away.

The objective of the data planning and modeling process is to provide a subject data base plan for the corporation. Many war stories about failures in data base exist in the industry, primarily because of a lack of data planning.

Data planning requires the development of a data model which must be fully integrated with the systems planning process. Figure 2 shows how the pieces of the puzzle fit together. In this strategic planning process the business plan feeds the business systems plan, which in turn develops requirements for the data base plan.

Under the business systems plan we develop a description of each business process, the activities which occur under the process and supporting

(Continued on SR/12)

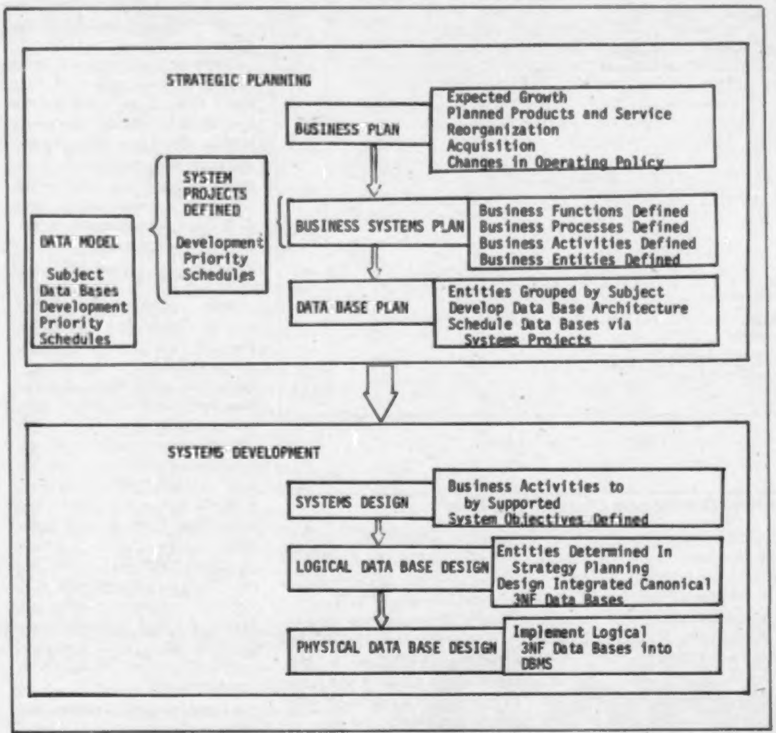
STRATEGIC PLANNING
BUSINESS PLAN
Expected Growth
Planned Products and Service
Reorganization
Acquisition
Changes in Operating Policy
SYSTEM PROJECTS DEFINED
Development Priority Schedules
DATA MODEL
Subject Data Bases Development Priority Schedules
BUSINESS SYSTEMS PLAN
Business Functions Defined
Business Processes Defined
Business Activities Defined
Business Entities Defined
DATA BASE PLAN
Entities Grouped by Subject
Develop Data Base Architecture
Schedule Data Bases via Systems Projects
SYSTEMS DEVELOPMENT
SYSTEMS DESIGN
Business Activities to by Supported
System Objectives Defined
LOGICAL DATA BASE DESIGN
Entities Determined In Strategy Planning
Design Integrated Canonical 3NF Data Bases
PHYSICAL DATA BASE DESIGN
Implement Logical 3NF Data Bases into DBMS

Figure 2. Overview of Data Modeling

Business Function:	PRODUCTION
Business Process:	MANUFACTURING PRODUCT "A"
Activity:	DETERMINING QUANTITY PURCHASING RAW MATERIALS SCHEDULING PRODUCTION DETERMINING PRODUCT SPECIFICATIONS
Entity:	CONTRACT PRODUCT EMPLOYEE SUPPLIER INVENTORY

Figure 3

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Crawl Before Walking in Data Base Planning

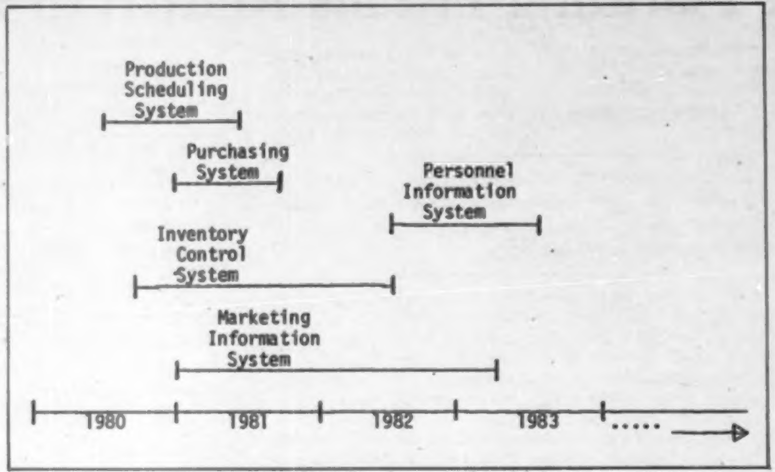

Figure 4. Precedence Development Chart for Systems

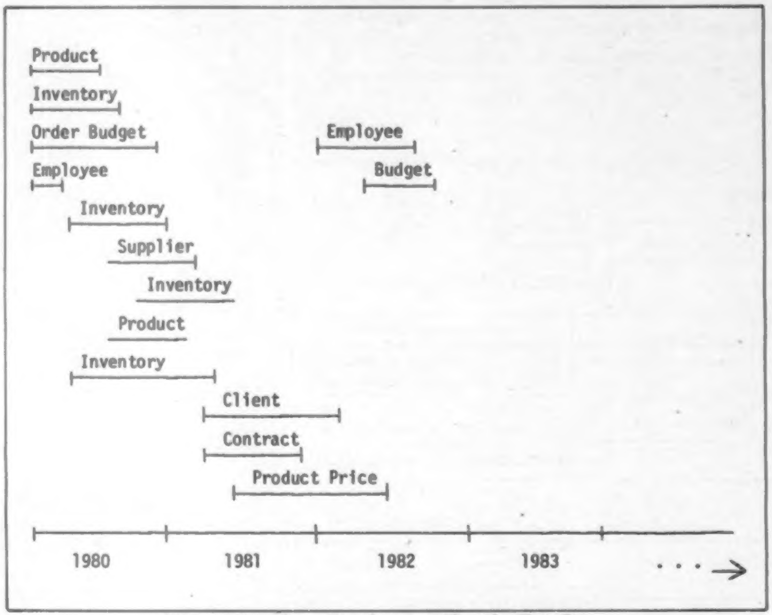

Figure 5. Precedence Development Chart for Data Bases

(Continued from SR/11)

entities for the activities based on the business functions defined in Figure 1. For example, these terms might be determined for a production function, as in Figure 3.

Industry experience has shown that most companies define approximately 25 major systems projects from their BSP effort. After determining that the resources are not available to concurrently tackle 25 systems, they normally settle on half of those for concurrent project team development. This is a mistake. The majority of companies should only have three or four systems development efforts under way at any point in time.

The data model consists of establishing the entities necessary to support business activities and, in turn, processes. Entities should be thought of as an information group needed for a business activity. Both systems projects and the data model are passed to the actual systems development process once the strategic planning is complete.

Systems Development

As shown in Figure 2, three major design efforts occur during systems development. The systems design effort is bounded by the set of activities defined in the strategic planning process.

It is not unusual in medium to large corporations to find that several systems projects have been established with the same objectives. This results in wasted resources that could have been directed toward the achievement of other systems objectives. Therefore, one purpose of the strategic planning process is to define the blocks of business activities that represent the support requirements of an information system.

The logical data base design effort that occurs during systems development is bound by the business activities, entities and data base plan developed during strategic planning. This process requires detailed analysis to establish the inter- and intraentity relationships which formulate the logical data base design.

Data Architecture

There are 12 steps necessary to complete a data architecture. First, represent the organization as business functions at the highest level possible — for example, production, marketing, management, support service.

Second, identify the business processes and activities that occur within the business functions described in Step 1. (Activities within processes within functions.)

Third, establish specific decisions, questions, transactions and informational education required in each of the activities described in Step 2.

Fourth, determine the entities required to support the business function activities (by decisions, questions, transactions, and informational education) developed in the previous steps.

Fifth, develop a set of entity matrices to display the information developed in the previous steps. The necessary matrices are as follows:

- Business Function Decisions vs. Entities.
- Similar Decisions vs. Entities.
- Business Function Questions vs. Entities.
- Similar Questions vs. Entities.
- Business Function Transactions vs. Entities.
- Similar Transactions vs. Entities.
- Information Education for Management and Control vs. Entities.
- Business Function Supplying vs. Entities.
- Business Function Changing vs. Entities.
- Business Function Deleting vs. Entities.

Sixth, group and name related activities by business function into systems projects with well-defined objectives — for example, which activities will be supported by each systems project. List these projects by name.

Seventh, determine a priority of development for the systems projects determined in Step 6. Show the result of steps 6 and 7 in the form of a precedence development chart, as in Figure 4.

Eighth, group the previously defined entities into related subjects necessary to provide the data to support the activities that occur in each of the systems projects defined in previous steps. The matrices developed in Step 5 will aid in completing this step.

Ninth, establish data base names for the subject entity groups determined in Step 8.

Tenth, determine the time requirements for developing each system defined in previous steps. Display the result of this step as a precedence development chart.

Eleventh, develop a set of data base matrices which indicates their association with systems projects. They are as follows:

- System Project vs. Supporting Data Base.
- Systems Data Bases by Systems Project vs. Entities Required.

Last, complete the association of subject data base development to systems projects by drawing a data base precedence development chart over the planning horizon of the systems projects, as shown in Figure 5. Thus, the chart developed in this step must be coordinated with the one developed in Step 10.

This step displays the time frame for data base development. Previous steps establish the subject entities necessary for business process support. As a result, the company has a set of interrelated data bases that will evolve to the future support of all systems. A data architecture is provided for future building of data structures.

Systems projects are defined and resources must be allocated for systems development as a result of the above steps. Many corporations attempt the development of 10 to 13 systems projects concurrently. This represents the impossible since most companies do not have the resources to attempt such an effort.

It is generally recommended that a company attempt no more than three to four concurrent developments of systems. Looking at Figure 4, you will note that through 1983 a maximum of three systems are being designed at the same time.

However, upon inspection of Figure 5, you will note that more than three subject data bases are being designed within the same time frame. All such designs must be funneled through and controlled by data administration and data base management in order to be successful.

Strategic Plan

Some organizations today are not developing a strategic plan for data bases. Only luck and a static business environment will save these companies from ultimate loss of data base integrity.

Many corporations do recognize the significance of a business systems plan; however, they do not realize that they must also have a data base plan.

Using a systems plan without a data architecture will lead to application-oriented data bases and force the corporation to spend approximately 80% of its DP dollar on "maintenance."

A very few organizations are superimposing a data architecture model over their business systems plan. These are the electronic organizations of the future that will significantly reduce their maintenance costs, provide program and data independence, add new applications with ease and enjoy an effective user environment.

Through strategic data base planning and designing normalized data bases, we will finally enjoy the true advantages promised by the data base environment.

Holland is president of Database Design, Inc. in Ann Arbor, Mich.

Survey of Users Turns Up Range Of Strategies For Data Base

By Jeffrey A. Hoffer
Special to CW

Many information system professionals feel that a data base is essential for the realization of a true management information system (MIS). If this is so, proper data base design methods are necessary for the delivery of an efficient and effective MIS.

Proper data base design goes beyond the mere mechanics of file design. It also includes roles for various individuals in the design process and a recognition of the *redesign* process.

In an effort to better understand this process for inverted file data bases, 71 users of six data base management systems (DBMS) with secondary indexing capabilities participated in a survey. Questionnaires were completed by individuals with MIS positions ranging from data base administrator to MIS manager to programmer. The results indicate a wide range of experience, data base design strategies and perceptions among the surveyed firms. (A comprehensive review of this study is contained in "Methods for Primary and Secondary Key Selection," QED Information Sciences, Inc., Wellesley, Mass., Monograph No. 9, 1980.)

What to Index?

The primary decision to be made in designing an inverted file is what to index. Who has the proper information to make this decision?

The accompanying table (with results for Software AG's Adabas, Applied Data Research, Inc.'s Datacom/DB, Computer Corp. of America's Model 204 and Intel Corp.'s System 2000) indicates that individuals close to and including the user are most likely to identify and select keys for indexing. However, for users of Model 204, the technical expertise of systems programmers is also sought.

A more detailed analysis of the survey data indicated that the most likely team for data base design was the systems analyst-user pair. Further, this same data showed that this analyst-user team preferred, more than other possible teams, *not* to seek the advice of systems programmers.

Data base design does not occur once; rather, useless key indexes are purged, new indexes are created and temporary indexes are created to meet transient needs. Data base design, then, is an adaptive and evolutionary process.

More than half of all those surveyed indicated that they systematically redesign their data bases by purging indexes that are no longer necessary in order to conserve file space. Index purging was most popular among System 2000 users, where even infrequently used indexes were deleted.

New Indexes

Even more popular (more than 66% of those sampled) is the creation of new indexes after the data base goes into operation. Frequently this is done to meet an originally unanticipated data selection requirement, although general data base access performance improvement also contributes. Again,

(Continued on SR/18)

WHO IDENTIFIES POTENTIAL KEYS

% of Respondents Where Particular Job Categories Are Identifiers of Potential Keys

Person Identifying	ADABAS	Datacom/DB	Model 204	System 2000	All Respondents*
Data Base Administrator	83.3	61.9	40	62.5	62
Systems Programmer	5.6	47.6	100	12.5	22.5
Application Programmer	44.4	38.1	40	37.5	40.8
User	61.1	52.4	70	56.3	54.9
Systems Analyst	94.4	90.5	90	93.8	85.9

*These figures include data from users of two other packages which, individually, had too few responses to be analyzed separately.

Survey Results on Key Selection

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Basis for Comparison

Proprietary Software Often Right for DBMS

By Phyllis R. Briller
Special to CW

If you have an application that requires processing under a data base management system (DBMS), the proprietary software industry can frequently provide *the* system to satisfy your application. The basics of the application and the technical architecture can be explained in a few hours by a competent vendor sales representative.

There are a few critical areas that might provide a meaningful basis on which to compare the several DBMS products on the market that appear to fit the application.

Look for "all-purpose" design criteria which can be readily redefined for specific usage — those needs defined today and those that are deemed necessary a few years from now. Examples of this include:

- Multipurpose keyed segments. The ability to easily redefine a segment and edit the incoming data based on the segment key adds a dimension of flexibility to the type of data that is to be retained.
- Exit Routines. A well designed system plans for the norm and anticipates the unexpected. Exit routines are a means of achieving that special calculation or of reading that extra file that makes your environment so special. Look for a vendor who builds into DBMS design specific places to exit from the mainstream programs, allowing you to satisfy your own requirements and then reenter.

Proper use of this aid should not degrade system performance and will not require the technical staff to unnecessarily touch — that is, reprogram and test — the vendor's system.

- Directories. Look for a balanced usage of directories, tables and other user convenience tools. A directory will allow the application user to define many criteria in the system. If well designed, this eliminates hours of programmer maintenance on a continually changing system. If poorly designed, it can degrade processing time because the system is continually looking up user-defined criteria in tables peripheral to the mainstream processing.

Evaluate the purpose of the documentation that is supplied with the programmed DBMS. Good documentation defines the commonly accepted DBMS vocabulary in the terms of the specified application. Manuals should be written on two levels.

One level is for the application specialist, who is rarely conversant in DBMS jargon and requires computer assistance only to achieve his performance evaluation on the job. This means that DBMS user documentation must address the needs of the application; it should offer illustrations, examples and suggest alternate or additional ways of using the system.

Look for instructions that can step the newly hired input clerk through a transaction and augment a harried supervisor, under pressure to meet a deadline in the wee hours of the morning.

Insist that user documentation define applicable DBMS jargon and discuss the advantages and limitations of the system's architecture on a level that the user can understand.

The second level is for the data base administrator (DBA) and the application technical support staff, who are entitled to an overview of the application, comprehensive flow charts and program listings in addition to program narrative.

Look for helpful hints in the narrative. If a vendor's technical writers have hands-on experience, they will anticipate the potential enhancement of the system and include directions and suggestions. Inspect the program listings for similar comments sections.

Original Design

Investigate the purpose of the application's original design. The analysis, development, testing, documentation and marketing of a comprehensive product requires substantial financial commitment over several man-years.

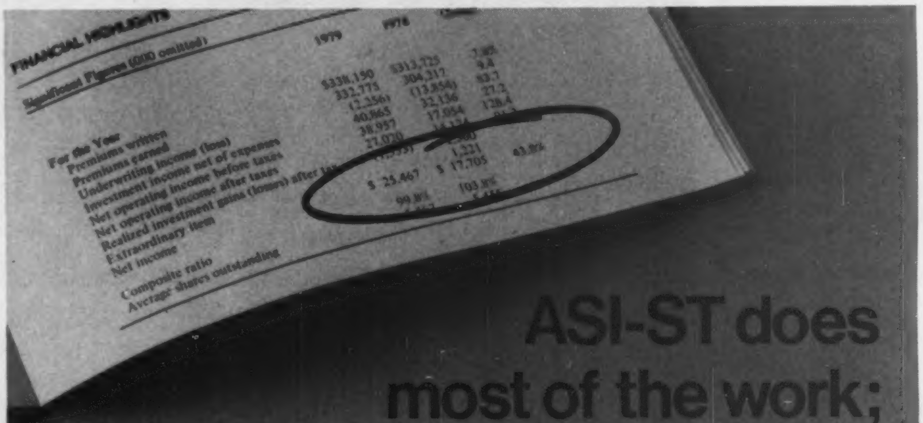
An application that was designed in a vacuum or, conversely, designed around a specific industry may prove too limiting as a general purpose product and impossible to retrofit in your custom environment.

Determine that the preprogrammed product makes the best use of technologies available under DBMS for your application. The bells and whistles and hoopla that accompany the announcement of a DBMS release are enticing and meet the criteria of some applications.

But scrutinize the bells and whistles in the vendor's product to determine that they are required on the application, that any peripheral equipment can be cost-justified and that programmer maintenance loads will not be impacted by unfamiliar techniques or volatile programs.

Consider the long-range plans in DBMS evaluation — to the extent that they can be predicted — and determine that this corresponds to your firm's long-range goals. Consider the ease or difficulty of converting the vendor's file structures from the DBMS under consideration to another DBMS that may be a replacement within a few years.

(Continued on SR/18)



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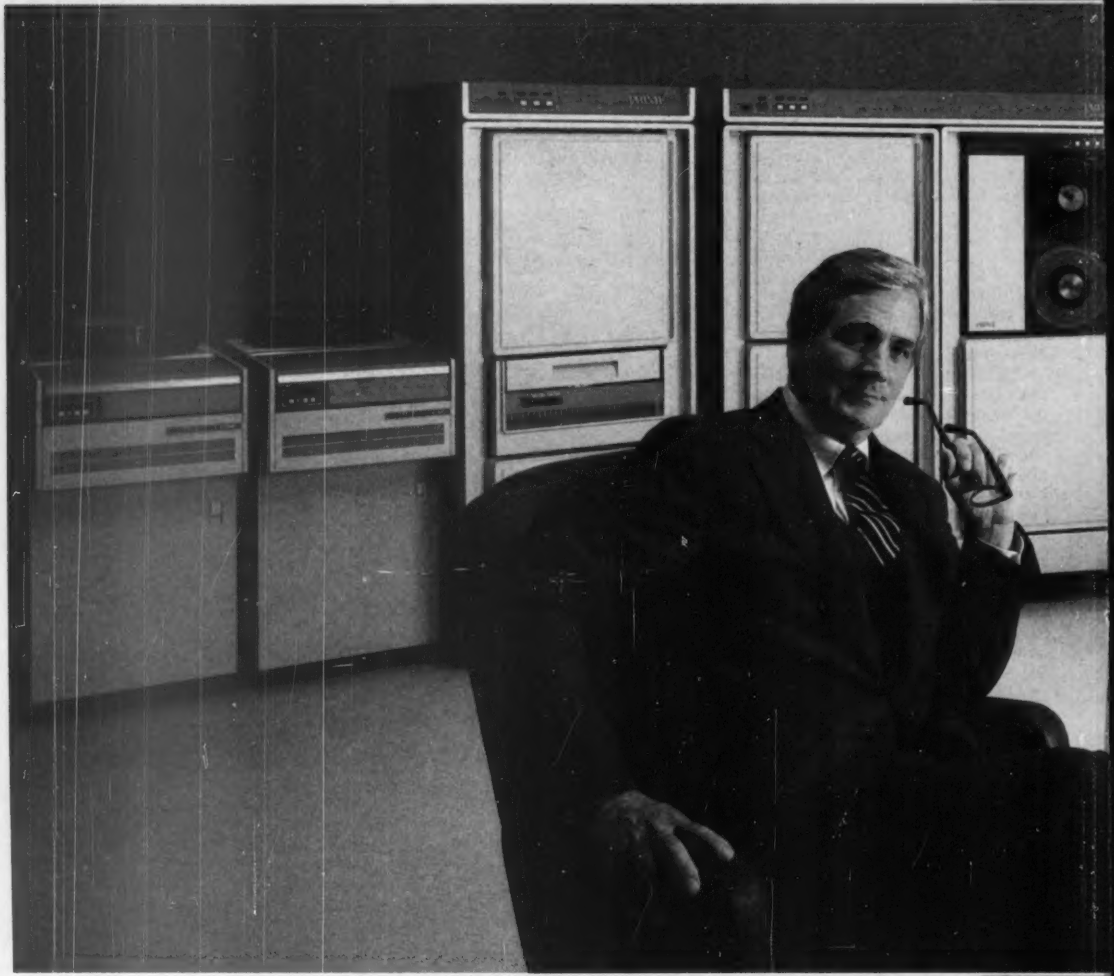

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Proprietary Software Can Fill DBMS Needs

(Continued from SR/15)

An aid in this evaluation might be to determine the degree of modularization employed in the design. A good system designer can extract sections of the overall architecture to meet a specific application without impinging on the integrity of the remainder.

Conversion of a module from one DBMS to another — however monumental that task may be — is infinitely simpler than attempting the conversion of a major system in toto.

Investigate the DBMS development history — the pedigree of the vendor. Weigh equally the applications and the data base experience of the firm. Its data base commitment should represent a substantial percentage of a research and development budget.

Determine also its commitment to adjunct state-of-the-art development — such as on-line terminal access and distributed processing — which is indicative of the interest of the firm in maintaining a strong leadership.

Is your firm honestly prepared for a data base management system? Is there DBMS management experience in-house? Determine, in the evaluation, the extent of a vendor's commitment to training the firm's staff.

The vendor may be ready, willing and able to assist in the implementation and operation of its system, but may draw the line at developing your in-house operating procedures or writing the job description for the DBA.

Other Questions

Other questions to ask: Is the preprogrammed system so designed as to be compatible with existing systems in-house? Are the DBMS technologies consistent with those already in operation? What has been the firm's success rate in modifying DBMS programs to run compatibly?

And finally, investigate a continuing working relationship with the vendor. Will you invalidate the warranty if you modify your version of its product? Look into a commitment that the vendor's technical staff will be available to you during installation, modification and during the first crucial months of operation.

During the two to five years after installation, if your firm follows a typical pattern, modifications and enhancements will be system requirements. Without a doubt, there will also be support staff turnover.

Retraining Ability

Investigate the ability — and the past performance — of the vendor to retrain staff and to consult with the technical group on the impact of additional changes.

Choosing a preprogrammed product for a specific environment is never a simple task. The complexities of a data base management system impact further on the requirements.

After convincing your user that the application needs can be satisfied, verifying the integrity of the design concept and determining that the quality of the programs meet your firm's internal standards, satisfactory answers to these additional criteria will assist in selecting *the* system for your application.

Briller is special projects consultant for Information Science, Inc. in Montvale, N.J.

Survey Shows Data Base Strategy Range

(Continued from SR/15)

dynamic index creation was most popular (93%) among System 2000 users; 90% of Model 204 users actively create new indexes.

The temporary creation of indexes is not, however, very popular, cited by only 14% of the sample. When it does occur, it meets a one-time requirement such as an infrequent report, access to a sample/test data base or to sort data.

Design Parameters

In general, the survey results indicated that keys and associated indexes are usually chosen early in information systems development, when the user is still closely associated with the project. Although no one criterion dominated consideration of indexes at that time, various index maintenance costs were important. Surprisingly, fully indexing on all possible keys was very unpopular — only one surveyed firm claimed to do this — even with the significant user involvement. Also surprising was that more than half of the sampled users said that ease of programming was a major reason indexes were created.

Design Information

Finally, information for data base design is primarily drawn from experience and intuition. The most popular source of objective information was vendor-supplied manuals. Although several data base management texts were referenced, no "frontier" sources — monographs, scholarly or society publications, for example — were mentioned.

The survey has shown that, for one type of DBMS, data base design is adaptive, ongoing and utilizes much user and experiential data. It is conservative in that maintenance costs are important.

Yet, approximately 50% of those sampled were discontented with current data base design practices and sought more systematic manual or automated tools to assist in the process. The tools described in published literature have not, in great measure, been utilized.

Hoffer is an associate professor of operations and systems management in the School of Business at Indiana University, Bloomington, Ind.

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Learning the Hard Way

Dictionary Needed Before DBMS Conversion?

Special to CW

SAO PAULO, Brazil — Should a user acquire a data dictionary before installing a data base management system (DBMS)?

Yes, said Jair Rodrigues da Silva, data base administrator at the Bank of Sao Paulo in Sao Paulo, Brazil. And da Silva is in a good position to know because his bank, otherwise known as Banespa, did the opposite. It acquired IBM's IMS DBMS first and then purchased Data Catalogue 2 from Synergetics Corp.

If Banespa had taken the dictionary route first, the DP department could have seen what the data really was, da Silva noted. "With the dictionary, we could have seen the uses of data and then developed standards for the users and for applications. By using a dictionary before installing a DBMS, we would have resolved the problems of sharing data."

Da Silva is a strong believer in data sharing despite the problems posed by his bank's needs for security. As it stands now, much of Banespa's data is still on a file system and not entered into the dictionary. Each file is independently owned by a different person.

While this method of ownership does solve security needs, it often produces embarrassing results. Frequently the same information is in more than one file, and when the data changes, all the related files are not necessarily updated.

As a result, different reports using the "same" information are often out of sync with each other, he noted.

Documentation Need

But it was not the conflicting reports that forced Banespa into buying a data dictionary. It was the need for documentation, a must with any DBMS, according to da Silva.

At first, Banespa — an operation with 400 bank branches, a central DP department, 10 satellite installations and a DP staff of 500 — tried to develop its own dictionary. The attempt was unsuccessful, and the in-house product was never used.

Realizing the need to purchase a dictionary, da Silva headed a study of five dictionaries: IBM's dictionary for IMS, Pride-Logik from M. Bryce & Associates, Inc., Lexicon, Cullinane Corp.'s Integrated Data Dictionary, and Data Catalogue 2.

The IBM dictionary was difficult to use, according to da Silva. Its tie-in to IMS created problems. At the time, Banespa was having difficulty with IMS and was considering switching to Adabas, a change that would require purchasing a new dictionary.

Independent Dictionary

In the area of independent dictionaries, da Silva noted that to install Lexicon at Banespa, a consultant would have to be hired. It was an option the bank wanted to avoid, he explained.

As for Pride-Logik, it lacked an IMS interface when the matter was under study over a year ago, and used a difficult methodology, da Silva recalled.

In the end, Data Catalogue 2 was selected because it is an independent dictionary that supports IMS and because it is very easy to use, he noted.

Once Data Catalogue 2 was installed, the decision was made to enter only DBMS applications into the dictionary. The standard file applications were overlooked at this step because they were, in general, nearing the end of their life cycles.

No Data Changes

The DBMS information was entered without making any changes in the data, da Silva explained, adding, this task is nearing completion. The next step calls for developing and implementing standards for data names, lengths, use of dates and job counts, if management approves of the project.

Once the plan is approved, the data bases will have to be changed accordingly. But this step could have been eliminated if the dictionary had come before the DBMS.

The dictionary system could have been used to help develop standards as a preliminary step to choosing and installing a DBMS.

At Banespa, only the data administrators use Data Catalogue 2, but da Silva expects that in the future, programmers and designers will use it as a tool in development.

Decreased Training Time

One of the side benefits of Data Catalogue 2 is a decrease in training time. While staff turnover is not as common at this bank as it is in the U.S., it does present a problem because most programs are only documented when they are first developed; therefore, updates are not generally reflected in the documentation.

If the application has been around for any length of time, new programmers must talk to the individual doing the maintenance work. Hopefully, he has some notes available, notes that are probably only on scratch paper, da Silva lamented.

Training can take up to six months, he continued, adding that for individuals learning the DBMS applications that are entered into Data Catalogue 2, training is cut by approximately 50%.

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Evolutionary Process

Data Base Viewed From a People Perspective

By Paul R. Hessinger
Special to CW

The DP manager moved cautiously down the hall of the executive office area, followed closely by a technical consultant he had hired less than six months before to analyze the direction of DP technology and what was available to help the operation of their rapidly expanding manufacturing firm.

The two men approached the secretary's desk and the DP manager asked if the president was available. "Oh yes," she replied. "He's been waiting for you — go right in." In recent months, there had been many meetings discussing the DP function between the vice-president of finance, other vice-presidents and the president. On occasion, the DP manager was invited to participate. But *never* had he been summoned directly to the president's office.

The fact that the president was waiting did nothing to calm the man's nervious system, especially since he was aware of the high turnover rate of DP managers.

In recent weeks, DP had come under pressure to explain serious inconsistencies in management reports dealing with the financial aspect of the business. The DP manager had involved the consultant in the problem and was taking a gamble that his cohort could assist in explaining the problem, if not offering a solution, to top management.

The president came directly to the point: For the month just ended, they had no accurate idea of the firms' financial performance. "Our revenue forecast indicates one set of numbers, our financial statements another and our accounts receivable don't agree with either," added the vice-president of finance. "The accounting department's manual records do not agree with the computer reports either."

The DP manager attempted to outline the various reasons for the difficulties just discussed. Among them:

- A system failure which destroyed a portion of the general ledger file which was then restored, but after financials were printed and before forecasts were run.
- A batch of accounts receivable which were not posted to the A/R file — they missed the keypunch deadline.
- A program bug which he believed resulted from a "unique" — not documented — file-handling technique coded by a programmer no longer with the firm. That file was now stored in a different key sequence and the systems staff had not had time to prepare the sort logic necessary.

Mercifully, the chief executive put up his hand to stop the dissertation.

"I won't pretend I understand all of that — it does seem quite legitimate and logical, but isn't there a fundamental problem we can address to get us on the track to more accurate and timely information. I'm willing to invest time and money if necessary."

Consultant's View

At this point, the DP manager introduced the consultant and asked him to provide his analysis of the situation.

The consultant's reply: "In my investigation of your applications portfolio I've applied canonical synthesis to the logical data structures employed and have discovered a very high frequency — approximately 93.286% — of data embedded in application program logic which is largely responsible for the integrity and synchronization problems currently being encountered.

"As a solution, I would recommend the design of a master data base each of which would employ relational technology to reduce the data base to the third normal form. This would eliminate the possibility of semantic disintegrity upon querying the data base."

Before any questions could be asked — could any be expected? — the consultant excused himself to attend a meeting with a vendor offering a data base management system. The consultant was quick to point out to the executives that while this may not be *the* answer to their problems, "it is really quite a simple solution — data base."

Left alone with the executives, the DP manager tried to clarify the data base concept. "A single storage facility for all of the data upon which our information is based," he explained. "A software package which manages all of the data we use."

"How much will it cost?" they asked.

"It will be substantial," the DP manager replied. After a lengthy discussion, the executive concluded by addressing the DP manager. "It is your decision. If you think it will help, then get us a data base. But we need to solve the problem, and quickly."

Final Thoughts

As the DP manager walked back down the hall, he had two final thoughts. One was the plaque he noticed on the chief executive's wall as his eyes wandered during their meeting: "An ounce of application is worth a ton of abstraction." He knew the ounce would have to be produced quickly.

His other thought was that given even his limited understanding of data base at this point, he sensed the tremendous impact it could have on the people in this business.

Variations on the above events have occurred hundreds of times in many organizations over the last 10 to 12 years and could still occur today. The result described above — a "commitment" to data base — was a common one. Because of many such commitments, we are in position now in 1980 to assess the impact of data base management systems by looking at what the impact *actually was*. In addition, as the data base methodology continues to be implemented, we can accurately predict what its impact *will be*.

One measure is the impact of data base on those individuals involved with computer systems at various levels — management, DP staff and user personnel. Our overall assumption is that data base has had a significant impact on the information systems community. It has been an evolutionary process.

In the early days of data base technology implementation, the objective of the effort was still largely abstract to those involved with it. Data base was often viewed as a messiah for other DP concerns — development of management information reporting systems — alias MIS — successful implementation of on-line systems and reduction in system development time and costs.

Early DBMS

The early DBMS software products through no fault of their developers did not directly address these concerns. But in attempting to sell the data base concept, various individuals emphasized these potential areas of benefit rather than the fundamental objective of DBMS — effective data management.

To say that data base and its primary implementation tool, DBMS, was slow in having a widespread impact should not receive an argument. By the mid-1970s, improvements in major DBMS like Total and IMS/VS, the availability of various new approaches to data base such as Adabas and IDMS, and a growing understanding that DBMS was part of an overall program meant that data base was established as an integral part of the DP function.

At the close of the 1970s, there had been improvements in the accuracy and timeliness of information systems in many organizations. How many people actually attributed such improvements to data base is an interesting question.

'Back Office' Operation

First consider top management. In the early stages of DP growth within a business, the function was viewed as a "back office" clerical operation which provided little tangible benefit directly to executives. However, as the need for better information grew, DP was looked to as a vehicle to provide such facts and figures.

Top management at first believed it still was not their concern — "the computer would take care of it." And as our example pointed out, executives saw difficulties in utilizing the computer, not necessarily better and faster information. Data base (and DBMS) was one of the earliest "state-of-the-art" technologies aimed at significantly advancing DP's contribution to a business.

But it cost money and because of the technology, a top executive was no longer able to apply cost/benefit analysis in order to make the decision to go data base. The result: Over a long period of time, a top level awareness of the DP function grew and manifested itself in many ways. The existence of vice-presidents of data processing (or other such titles) is another indication of the level of awareness DP has as-

(Continued on SR/22)

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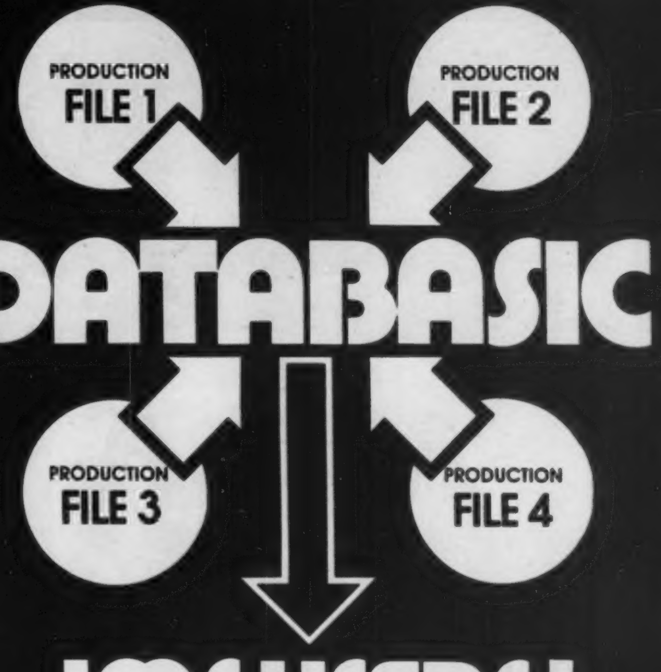

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People's View Of DBMS Given

(Continued from SR/20)

cended to.

How did data base affect the DP technical staff? Simply stated, DBMS provided the ability for the vast majority of programmers and analysts to be less involved with the "internals" of the computer system and more concerned with effectively providing necessary information to users.

To be sure, "heavy" technical personnel were still required to guide the computer and the DBMS, but the personnel that users were required to interact with could be less technical and, in a sense, "more people-oriented." Data base had the impact of altering the role of those individuals called programmers.

Growing Pressure

Before leaving this area, another point is worth noting. While the role of the development staff began to change towards a less technical orientation, the pressure on this group to produce information systems as quickly as possible grew.

This was a "Catch-22" aspect of data base — it provided a capability which allowed for better information systems, but it did not directly allow the development of these systems. Programmer productivity became a major concern. Data base helped to focus attention on the need for automated development aids.

What we have seen is the evolution of a more "aware" community of users for which data base provides a community of data. It is now common to find users who are comfortable in describing their data requirements as well as their information needs to systems analysts and data base designers.

Finally, there are two individuals whose roles developed out of a need to shepherd the data base effort: The data administrator (DA) and the data base administrator (DBA). The DA has evolved more recently and is the representative of top management and the user community — "a policy maker."

The DBA is the technician responsible for the DBMS and the data base itself. The existence of these positions is an indication of the impact of data base.

If we were to return to the DP manager of our earlier example, what might we find? Top management which is committed to an effective DP unit employing technology like data base. Concentrated efforts in the data management area with the DBA overseeing development. Users who are more knowledgeable in the use of information systems and their role with these systems.

Given the proper blend of expertise, time, money, commitment and luck, it is not unreasonable to expect all of the above. Data base has played a large role in making these developments possible. But where people have been involved with the effort, an old Chinese proverb applies to their reaction to data base:

- I hear and I forget.
- I see and I remember.
- I do and I understand.

Hessinger is a technical consultant and manager of information systems for Computer Task Group, Inc., in Buffalo, N.Y.

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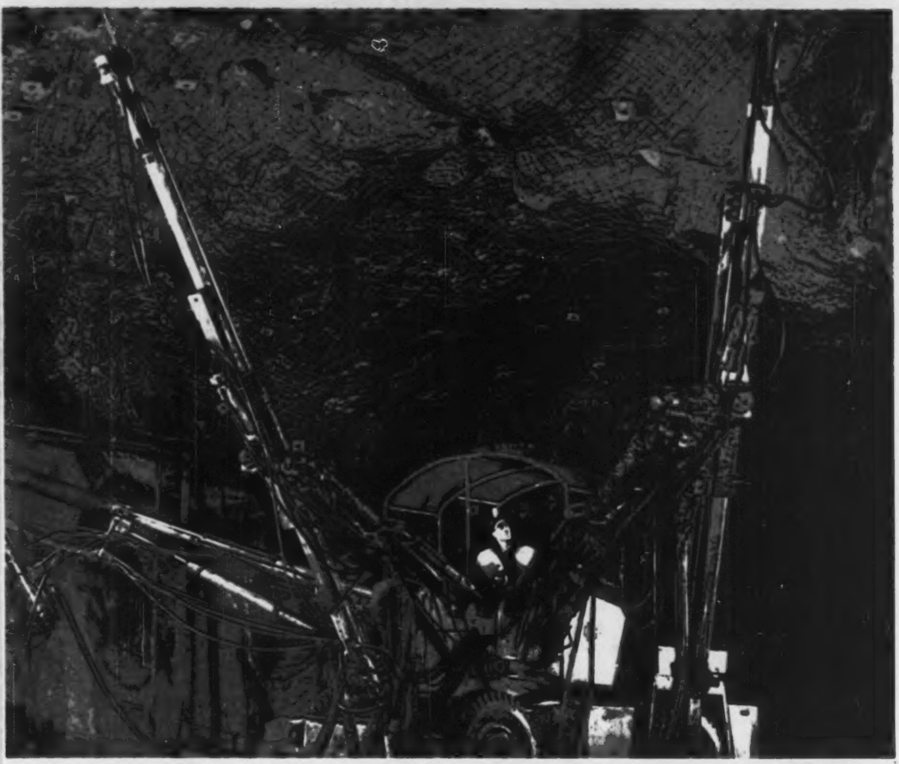

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Internal System Runs Dim, So Power Company Plugs Into Commercial DBMS

By Steve Froneberger
Special to CW

CHARLOTTE, N.C. — Duke Power Co.'s decision to look into commercially developed data base management system (DBMS) was spurred by one of our user departments that was using an internally developed file maintenance system. The facility was not responsive to their increased usage and growing requirements for concurrent batch and on-line operations.

To find a solution to this problem, the computer services department formed a committee to analyze user experiences with our in-house file maintenance system, evaluate its performance, define user requirements and determine the overall effect of the DBMS approach on Duke's DP needs.

The committee included eight users and two members of the DP staff. After five months, the committee recommended that a second group be formed to determine if it was feasible to upgrade the in-house system and to evaluate commercially available DBMS for use at Duke.

This second committee also consisted of users as well as computer services personnel. We concluded that upgrading the internal file maintenance system was not a viable solution. We also evaluated Intel Corp.'s System 2000, a DBMS used by another Duke department and found that it did not meet our needs.

DBMS Candidates

Efforts then focused on selecting viable DBMS candidates. Our "academic" evaluation included reviewing literature on available DBMS and attending a Datapro Research Corp. seminar on "Comparative Analysis of Data Base Systems." Using guidelines, techniques and information from this seminar, we defined our evaluation criteria.

These included facilities and characteristics of the DBMS, ease of use and installation, vendor support and resource requirements.

Having decided to research Software AG's Adabas and IBM's IMS in greater detail, representatives from these vendor firms were invited to describe their systems to us in depth. We also interviewed users of each product who provided a considerable amount of insight and information.

We found that while IMS offers a wide variety of facilities, its resource requirements were excessive for our environment. Some IMS users reported long learning curves and extra personnel resource usage.

Adabas showed itself to be easier to install, maintain and learn — with modest resource requirements. So, we concluded that Adabas was the DBMS most consistent with our environment. This phase of evaluation took seven months.

Final Phase

The final phase of evaluation was our in-house testing of Adabas. Four people were involved in this effort, along with representatives from the programming staff that maintained the in-house system. We found that Adabas performed as specified. After three months, we purchased the system.

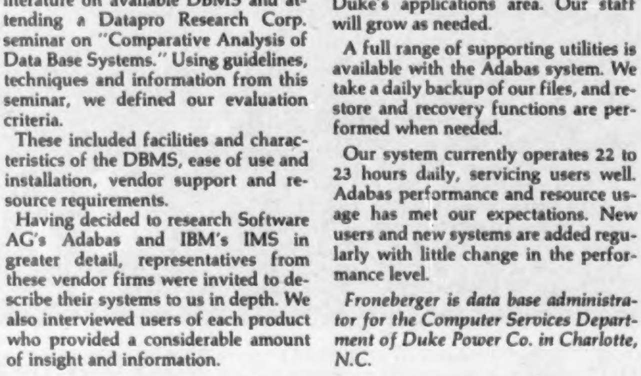
Since Duke had already established a data administration function in the technical services division, the newly created DBA function fit easily into this area. The DBA group's responsibilities were defined to include file and data base design, consulting with applications groups, handling system security, training new users, tailoring vendor training materials to meet Duke's needs, maintaining the data base and data dictionary, monitoring data base usage and coordinating changes made to applications systems and hardware systems that affect the data base.

There are currently two data base analysts assisting the DBA in these tasks. All of us were recruited from Duke's applications area. Our staff will grow as needed.

A full range of supporting utilities is available with the Adabas system. We take a daily backup of our files, and restore and recovery functions are performed when needed.

Our system currently operates 22 to 23 hours daily, servicing users well. Adabas performance and resource usage has met our expectations. New users and new systems are added regularly with little change in the performance level.

Froneberger is data base administrator for the Computer Services Department of Duke Power Co. in Charlotte, N.C.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'Why Me?' Approach Ineffective

Structured DBMS Training Approach Advised

By Dorothy V. Fisch
Special to CW

Many DP professionals feel they don't know very much about determining data base management system (DBMS) training requirements and usually respond to an assignment of this type by holding their heads and repeating "Why me? Why me?" Their area of expertise, designing and implementing information processing systems, hasn't taught them much about selecting training courses.

But by applying the techniques they use to determine system requirements to the training task, DPers could do a more effective job of determining training requirements.

Most people think they have determined training requirements once they identify the broad categories of people — for example, designers, analysts, and programmers — who will require training. Then, after searching for and selecting some available course which sounds like it will meet the needs of each identified group, they hope it will really teach what those people need to know.

This approach is analogous to believing that an application system's requirements have been clearly defined once it can be stated which departments within the company will be supplying data to it and using information produced by it. In system design it would be readily recognized that the system requirements process had only been started. The same is true when determining training requirements.

Deciding who needs to be trained is not enough information from which to select a training course. It is also necessary to know what the user will do on the particular job for which they will require training.

```
Application Programmer
System Designer
Data Base Administrator
System Programmer
System Analyst
Programming Manager
Upper Management
```

Figure 1

Structured Approach

Figure 1 contains a partial list of job categories for which some training in the use of a DBMS would be required. The first step in a structured approach to determining training requirements is to select one of these job categories and document what tasks those people do in their jobs.

This approach uses the technique of stepwise refinement to determine the job tasks done, and also uses the structure chart as a documentation tool to denote the job tasks. Figure 2 shows a high-level structure chart of tasks an application programmer might do on the job.

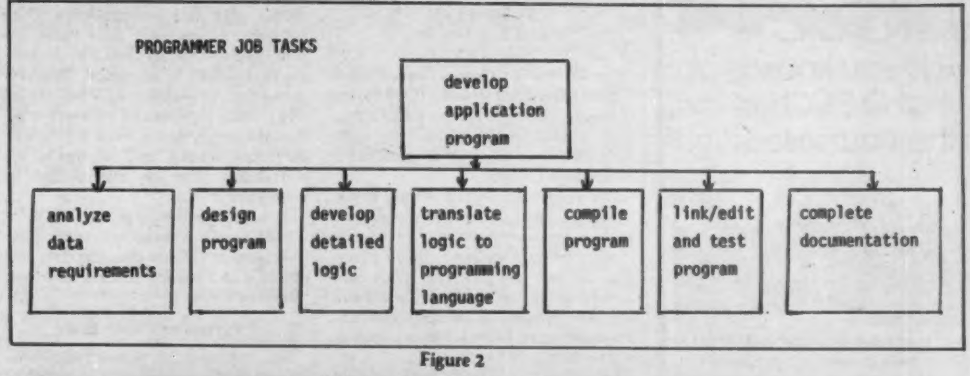
PROGRAMMER JOB TASKS
develop application program
analyze data requirements
design program
develop detailed logic
translate logic to programming language
compile program
link/edit and test program
complete documentation

Figure 2

The second step calls for breaking down these high-level, global tasks into the subtasks of which they are comprised. This process continues un-

(Continued on SR/28)

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Codasyl DBMS on Minis Offer

By Dave Field
And Roy Schulte
Special to CW

Cost-effective Codasyl-based data base management systems (DBMS) for minicomputers are not only a practical reality today, but they also offer some distinct advantages over traditional mainframe DBMS.

The myth that DBMS is only applicable to a large mainframe installation with a huge monolithic data base is rapidly being dispelled with the introduction over the past five years of a new range of superminicomputers and the development of sophisticated on-line interactive techniques and operating system tools for them.

Today, all the benefits such as data integrity and data independence obtained with mainframe DBMS are also available on minicomputer data bases. Minicomputer DBMS, however, extends those advantages by providing its user with a greater capability to handle interactive on-line environments, perform distributed data processing, and improve programmer productivity — generally at significantly less cost than mainframe DBMS.

In the early 1970s minicomputer vendors tended to be hardware- and engineering-oriented organizations with very limited expertise in commercial languages and sophisticated system software. In addition, disk capacities were very much smaller than they are today and thus not geared to data base systems that are generally applied with extensive use of large-capacity direct-access disk.

The great strides made over the past several years in hardware speed and performance capacity, and the development of sophisticated software tools and techniques have made today's minicomputers more powerful than most mainframes of 10 years ago. The minicomputers of 1980 are interactive, on-line-oriented systems with considerable capacity and flexibility. Also, it's now quite common to see minicomputers with close to 300M bytes of storage capacity per disk drive.

Data Base Pioneers

Data base management techniques were primarily pioneered by end users, some software suppliers and the large mainframe vendors in the late 1960s. Over the next 10 years, many new developments in data base technology were introduced. The minicomputer vendors, entering the field at a later date, were able to capitalize and improve upon the DBMS technology that emerged from the mainframes environment.

At the same time, the minicomputer suppliers have also improved their operating systems and I/O capability. In many respects, particularly in the handling of interactive applications, minicomputer operating system architecture is superior to most mainframe operating systems. Minicomputer vendors also have become much more sensitive to the needs of end users who, in turn, have gained more sophisticated understanding of their system requirements.

Mini makers are seeking, among other things, to give their users the traditional advantages available through DBMS — primarily, data integrity protection and data independence. Data integrity means that data bases are protected against accidental or deliberate destruction or alteration. Integrity protection measures in a DBMS generally include logging and recovery utilities, the ability to roll back logical update transactions and automatic restartability after an interruption in processing.

Data independence supported by a DBMS implies that several application programs can access the same data and obtain it in different formats for use in different ways.

Programmer Productivity

The emphasis in modern minicomputer DBMS, however, is not strictly on the generic DBMS advantages. Originally, data bases were promoted to imply centralized files and reduced data redundancy. Although data bases certainly do reduce data redundancy, this has become a secondary consideration to the vital problem of programmer productivity.

Since DBMS has built-in support for direct access by multiple application programs by handling all the mapping to and from the disk files for the user application programs, no special programming is required to control concurrent updates. Also, much of the application systems maintenance that formerly had to be performed in non-DBMS shops is virtually eliminated.

Without DBMS, up to 80% of programmer time is spent on maintenance in traditional DP environments. The greatest advantage in using a data base system lies in increased programmer productivity.

Increasing numbers of computer users are realizing this as they switch to minicomputer DBMS. Indeed, studies show that while the minicomputer market is growing at a rate of about 30% per year, the overall DBMS market is increasing at about 40% to 45% per year, and the minicomputer DBMS market is growing even faster — perhaps 50% to 55% per year.

Inherent Advantages

Minicomputers incorporate certain inherent advantages for data base capability that do not exist on mainframes. Since their inception, minicomputers have always been oriented to the on-line interactive environment, whereas most mainframes have traditionally been batch-oriented.

Data base operations also tend to be oriented to the on-line interactive environment. For example, users of data bases enjoy the advantages of being able to update files on-line and to interrogate the data base through an interactive query facility.

Obviously, if the hardware architecture and the operating software is interactive, then interactive data base operations are a natural function for the minicomputer. It can be generalized that it is easier to run batch oper-

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Advantages Over Mainframes

ations on an interactive system than it is to make a batch system run interactive applications.

Another advantage of minicomputer DBMS is that typical installations do not require a large DP staff to run them. Also, logical retrievals and reports can be generated from the data base by authorized clerical and other non-DP personnel using simple keyword commands supported by a query facility.

Another aspect that makes minicomputer DBMS so attractive today is that the initial investment is lower both in hardware and software. A user can get into data base operations incrementally, without the risk of having to implement a very complex system all at once. Commitments to the data base concept can be made in stages instead of all at once.

Distributed Operations

Minicomputer DBMS is especially valuable for its use in distributed data processing operations. For instance, most minicomputer manufacturers who offer DBMS have developed peer-coupled networking capabilities. Peer-coupled networks consist of individual nodes of equal importance to other nodes in the network.

By contrast, hierarchical networks have distributed sites of very limited intelligence communicating to a centrally-located, large "mother" mainframe.

Peer-coupled networking with minicomputers is usually a more cost-effective way of implementing communications between remote sites because each site can perform most of the processing locally, reducing the communication load.

A few minicomputer vendors, notably Data General Corp. and Prime Computer, Inc., offer Codasyl DBMS along with sophisticated communications and X.25 networking capabilities that are directly compatible with Telenet in the United States, Datapac in Canada and packet-switching telecommunications networks on other continents. Digital Equipment Corp. also offers a Codasyl DBMS and recently announced X.25 networking.

'Today, all the benefits such as data integrity and data independence obtained with mainframe DBMS are also available on minicomputer data bases. Minicomputer DBMS, however, extends those advantages by providing its user with a greater capability to handle interactive environments.'

Existing networking communication capabilities, when used in conjunction with DBMS, allow for easy distributed access and updating to data bases at remote sites.

Control Factor

. One of the major reasons why so many computer users are moving to minicomputers and minicomputer DBMS is to obtain more control over DP — particularly where the user formerly had to share a single large DP source. In many instances, the end user was losing control over its data, its applications and its budget.

With the implementation of minicomputer DBMS and well-defined system standards established by corporate guidelines, the user has its own minicomputer and, therefore, more control over data base, applications and budget. Minicomputers also are ideal for high-security environments since they can be physically unplugged from the network while extremely sensitive data is being processed.

A corollary to Codasyl standards compliance is that minicomputer vendors are now offering data bases that are compatible with those of mainframes. It is quite feasible in many instances to take a mainframe data base-designed application and convert it to run on a minicomputer.

True DBMS

Finally, a word of warning. Some of the so-called DBMS packages on minicomputers (and now even microcomputers) are not true data base management systems. They are often merely file management systems or sophisticated access methods. Therefore, a potential user of DBMS should investigate available data base systems very carefully.

Basically, a true minicomputer DBMS should perform the following functions:

- Maintain data structures and the internal logical organization of the data and internal indices.
- Log transactions and perform backup and recovery.
- Control access to data for security purposes.
- Make programs independent of data record layouts.
- Automatically compress data for storage.
- Allow concurrent updates by multiple on-line and batch programs.
- Help centralize data to reduce redundancy.

Full-scale cost-effective minicomputer DBMS is now available with all the features and benefits of mainframe DBMS. Minicomputer DBMS is online, interactive-oriented, incorporating all the advantages of the interactive environment. It is particularly effective for distributed data processing in networking systems, but can also be used efficiently in stand-alone configurations.

Above all, minicomputer data base management systems offer an opportunity to achieve significant improvements in programmer productivity.

Field is regional systems engineering manager for Data General (Canada) Ltd.; Schulte is product manager for Data General Corp.

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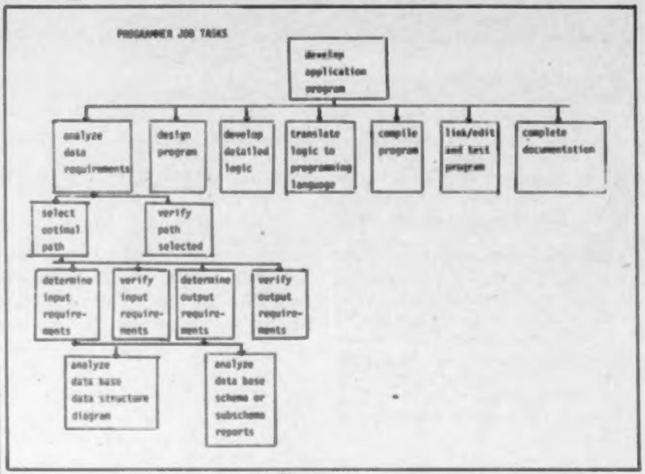
PROGRAMMER JOB TASKS
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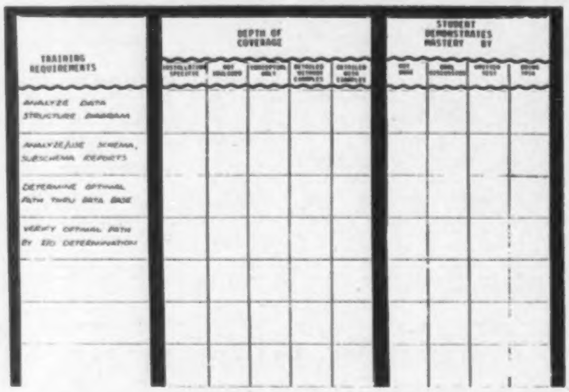
design program
develop detailed logic
translate logic to programming language
compile program
link/edit and test program
complete documentation
select optimal path
verify path selected
determine input requirements
verify input requirements
determine output requirements
verify output requirements
analyze data base data structure diagram
analyze data base scheme or subschema reports

Figure 3



TRAINING REQUIREMENTS	DEPTH OF COVERAGE					STUDENT DEMONSTRATES MASTERY BY			
	INSTALLATION SPECIFIC	[illegible]	CONCEPTUAL ONLY	DETAILED WITHOUT EXAMPLES	DETAILED WITH EXAMPLES	[illegible]	[illegible]	WRITTEN TEST	[illegible]
ANALYZE DATA STRUCTURE DIAGRAM									
ANALYZE/USE SCHEMA, SUBSCHEMA REPORTS									
DETERMINE OPTIMAL PATH THRU DATA BASE									
VERIFY OPTIMAL PATH BY I/O DETERMINATION									

Figure 4

(Continued from SR/25)

til each low-level box on the chart represents one clearly defined task. This is the same technique of functional decomposition used to design application systems.

Figure 3 illustrates how to break down the global task, "analyze data requirements." The subtasks noted could be further refined, but this is a sufficient level of detail to illustrate how to use this approach. The resulting detailed structure chart is used in the third step, which requires that each box on the chart be studied to determine what the person must know in order to perform that task.

Training Needs

From the structure chart shown in Figure 3, several distinct training requirements can be found. The person doing the task of analyzing data requirements must be taught to:

- Analyze the data structure diagram that represents the data base.
- Analyze and use the various available schema and subschema reports.
- Determine an optimal path through the data base given some definite requirement.
- Verify that the optimal path has been selected by determining the I/O operations involved.

This process, when completed for every global task, yields a complete list of what a person must know to do that job. This list is the training requirements.

Course List

Once training requirements have been determined for each job category, this list can be used to evaluate the various courses available. Make a check list of the identified requirements and use it to document which requirements are met by a specific course offering and which are not. Figure 4 illustrates this type of check list, which will provide all the material needed to determine which vendor's training package most closely meets your needs.

Rarely will any one course meet every identified requirement, especially when requirements are installation specific.

For example, at your installation the programmer may have to fill out a specific form or execute a specific cataloged or command procedure to obtain the schema or subschema reports.

No outside vendor will have included this type of training in its course materials.

Selecting the most effective training is not an easy task, but it can be much easier when the time is taken to determine all of the specific things personnel must be taught to do.

Fisch is educational consultant at DBMS, Inc. in Lombard, Ill.

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Managers Are Not Robots

Data Base Theories, Practices Do Not Coincide

By Durward P. Jackson
Special to CW

Management research points to fundamental differences between management theory and what is achieved in practice. Studies have found that managers are not the reflective, calculating robots found in the textbook. Rather, they are firefighters — action-oriented people who have little time for formal planning and control activities.

Indeed, the studies show that the better managers spend most of their time interacting with their environment, not sitting at desks reviewing computer-generated reports.

Similar differences between theory and practice are surfacing as the result of studies of data base management and data administration. While the literature is hawking the idea of information as a corporate resource, the practitioners entertain a very different perception.

The literature calls the data administrator a person who is more attuned to management than technical issues. The reality is that the typical data administrator is first a technical person whose primary concerns rest with operating problems, data base design and technical issues.

The literature says that information is a corporate resource to be managed for the benefit of the whole corporation. In reality, each functional or divisional manager jealously guards his data resources. No rational manager wants his peers or boss to see information about his organization before he does.

The literature advises that the data administrator be a senior vice-president in order to wield the power necessary to make information a corporate wide resource. The reality is that while a few organizations have followed this approach, most companies bury the data administration function within their technical staffs.

The literature hints that the corporate data base is a single physical data base with no data redundancy. In the real world, this feat is impossible for all but the smallest organizations given the state-of-the-art of hardware and software. In fact, the inefficiencies of most data base management software dictate many physical data bases with a great deal of data redundancy even within the same functional areas.

Why the Gaps?

Why do these wide gaps between theory and practice exist? First, it is easier to tell someone how to do something than it is to actually do it. The theorist is unencumbered by the human problems, the organizational environment and the problem of maintaining a disciplined approach. In short, he does not match his prescriptions to organizational requirements.

Second, theory precedes practice, often by years or even decades. The theorist performs a valuable service by advancing human knowledge, but the world is slow to adapt. We knew the essentials of strategic planning a century before it became widespread in business. The theory of data administration is likewise ahead of its time. Organizations will need time to adapt and assimilate these new ideas.

In the meantime, data administration and data base management do have a place in modern organizations. But their introduction and use must conform to the needs and social structure of the corporation. To blindly "go data base" is to invite disaster.

Organizational Placement

Data administration may be an idea whose time has come, but some currently held management perceptions may lead to its early demise. The most common of these perceptions is that data administration is simply another empire-building scheme. Why should the chief executive officer want to increase his span of control simply to accommodate another empire? Why should senior executives give up power for the same purpose?

If the data administrator cannot achieve his objectives through persuasion and through the director of information systems (who is usually a senior executive), why should he be given the sledgehammer of a vice-presidential title?

Perhaps more to the point, the data administrator's function is really just another dimension of systems planning. If the information systems department has been doing systems planning all along, most of the functions of the data administrator already exist. The problem then becomes one of introducing a new technology rather than a whole new organizational entity. Maybe the solution is to simply change the title of systems planner to data administrator.

If the administrative side of data administration should be retained in the information systems department, so should the technical aspect. Again, only a new technology is involved.

Procedural Changes

Of course, some procedural changes would be required. New skills would be needed. A closer working relationship between the programming group and systems planning is certainly in order. But a new organization paralleling the current one is redundant.

Another issue that arises when a data base management system is acquired is the consolidation of master files into functional data bases (or at the extreme, into a single data base). The design and implementation of the corporate "data base" is a lengthy job that will not be done overnight. While the planning and detailed design are proceeding, much can be done to put the DBMS to work immediately. It is neither necessary nor desirable to wait until the master plan is completed — it never is — to gain benefits from the DBMS software.

Other Function

Data base management software is usually sold as a solution to the overall data resource management problem. Indeed, Intel Corp. has cleverly repackaged System 2000 as "the information resource management family of products" to take advantage of the latest buzzwords. However, DBMS has another function — productivity improvement.

It is no secret that programming is the major contributor to information systems costs. These costs — especially the cost of writing information retrieval programs — can be greatly reduced by using the inquiry facilities of some DBMS software. Whether part of the grand design or not, new retrieval software should be written using the DBMS query language to improve the organization's productivity.

So much has been written about the evils of application-oriented data bases and the need for a highly-placed data administrator that many information systems executives are shy about admitting to variations on these themes. Yet, the research indicates that most data base implementations are somewhat less comprehensive than normally prescribed.

Simple Explanation

The explanation of the reality is simple. The successful information systems executive is a businessman first and more concerned about meeting user needs than in the elegance of the approach. His main goal is short-range productivity, but he recognizes that both short and long-range planning are necessary if all the pieces are to fit together. Therefore, the corporate data base is something for tomorrow. *Using* data base management systems to improve productivity is for today.

After all, productivity is not a bad buzzword in these inflationary times.

Jackson is a management information systems consultant practicing in Lancaster, Calif.

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Shipyard Charts DBMS for On-Line Inquiry. . .

By J.F. Davidson
Special to CW

PASCAGOULA, Miss. — In July 1973 Ingalls Shipbuilding, Inc.'s Information Systems Department formed a task force consisting of three people who were responsible for reviewing available data base management systems (DBMS). Information Systems was, at that time, interested in a DBMS which could be easily implemented for on-line inquiry processing to reduce the number of hard-copy reports required to support Ingalls' offshore oil rig production process.

Other reasons for desiring a DBMS were to reduce data redundancy, increase data integrity and provide more timely response to customer reporting requirements via inquiries.

Once the decision was made to acquire a DBMS, the Intel Corp. System 2000 plans were established on how to administer the system. A data base administrator (DBA) function was established that reported to the Applications Planning manager who, in turn, reported to the Information Systems director.

The primary user of the DBMS for application development, Business Applications, also reported to the information systems director.

This concept was used initially, but it gradually evolved to where Business Applications took over a majority of DBA functions; currently there is no formal DBA.

Along with developing a procedure for administering the DBMS, plans were being made as to which programmer/analysts were to be trained on the newly acquired DBMS. All key programmer/analysts were trained on-site by the DBMS vendor, MRI Systems Corp., but it became readily apparent that this training alone would not suffice to produce knowledgeable DBMS programmer/-analysts.

Because of the large systems targeted to be rewritten using the DBMS, Information Systems decided to contract portions of the application design and programming to the DBMS vendor. This turned out to be an excellent decision as it allowed Ingalls' programmer/analysts to work with experienced DBMS personnel.

Upon implementation of two major systems in 1975 using a DBMS, Ingalls' programmer/analyst personnel became familiar enough with the DBMS package that no further DBMS application subcontracting was necessary. Additional DBMS training classes have been conducted on-site as the requirement for DBMS applications expanded; presently more than 60% of the Business Applications staff is proficient in the use of DBMS.

Two Inquiry-Only Systems

The first two systems implemented using a DBMS were for inquiry only and were updated in the batch environment. This approach made the backup and recovery relatively simple to control.

The Purchase Order Status system was initially housed on two IBM 3330 disk packs that were backed up by dumping the packs after each update. The Work Authorization Plan system was initially housed on six IBM 3330 disk packs, backed up in the same manner. This approach worked very well and few problems were encountered in the backup and recovery area.

As previously mentioned, the DBA function evolved from a single DBA to where it is now primarily controlled by Business Applications.

Since 1975 eight major applications, including the Purchase Order Status and Work Authorization Plan systems, have been implemented using DBMS.

Prior to the system design phase of a potential DBMS application, existing DBMS applications are reviewed to ensure there is no duplication of data in the proposed system.

As each new DBMS application is implemented a considerable amount of time is spent reviewing the overall application performance. The primary areas reviewed are inquiry response times, disk space utilization and update process times, whether in the batch or on-line environment.

Inquiry performance reports are available on a monthly basis that contain performance data on all production DBMS inquiries; this is very closely monitored to ensure optimum teleprocessing performance.

Elaborate Controls

All DBMS applications have elaborate controls to ensure data integrity, whether they are updated on-line or in the batch environment. The types of controls vary from application to application, depending on the type of data contained on the DBMS application data bases.

Prior to anyone making inquiries to a DBMS application data base they must first be assigned a user ID and CICS password. This procedure is required for all data base applications whether System 2000 data bases or CICS data bases. The security procedure allows users access to only those inquiries, and through only those terminals, authorized at the time the user ID is established.

Monthly reporting is available containing statistics on terminal utilization, user activity and inquiry activity. Reports also are generated containing all security violation attempts by the various users. All user IDs are validated annually in order to keep security records current.

A number of problems were encountered in implementing the major applications using System 2000. Upon ac-

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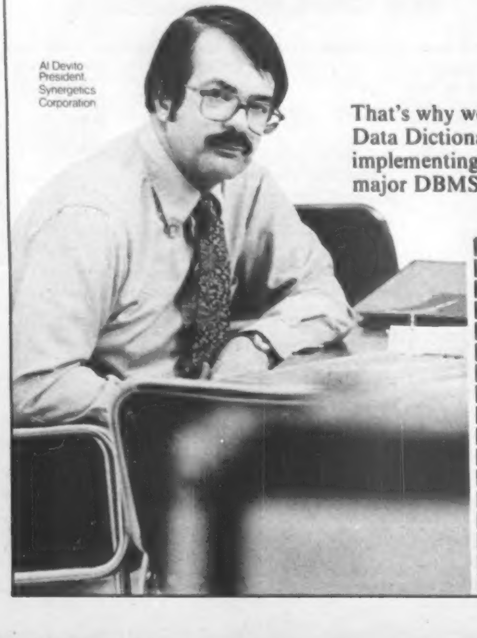

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. . . Application System Starts Small, Works Up

quiring a DBMS, Ingalls' Information Systems Department elected to implement two large major systems under the DBMS, rather than starting out with a small DBMS application. It is recommended that organizations using a DBMS for the first time implement a small application because if problems are encountered there is little or no impact to the overall organization or company.

Very late in the design phase of the Work Authorization Plan system, it was discovered that the hard copy reporting requirements could not be supported by the DBMS since the size of this system's data base was approximately one billion characters. To overcome this problem a Work Authorization Plan system parallel tape data base was established and used for hard copy reporting.

In order to ensure data integrity between the disk data base and the parallel tape data base, very complex and elaborate controls were implemented. The parallel tape concept worked extremely well and it has been used in lieu of the disk data base for many special processes.

Upon implementation of the Work Authorization Plan system and Purchase Order Status system using DBMS the batch update processes were found to use an excessive amount of computer time. Also, the inquiry response times in many instances were poor.

To overcome these problems, many hours were spent reviewing program code and data base designs. Through enhancing the program code and data base designs, the long run-times were reduced considerably. This problem highlighted the importance of experienced DBMS programmer/analysts being assigned to DBMS applications.

Initially it was believed that the use of a DBMS would decrease the amount of programmer/analyst time required to support systems under a DBMS. This turned out not to be entirely true as DBMS applications require highly skilled programmer/analysts and normal maintenance on DBMS systems is more complex than on non-DBMS systems.

System Improvements

After implementing the Purchase Order Status system in August 1975 and the Work Authorization Plan system in December 1975, no additional DBMS applications were implemented until September 1979. From January 1976 through late 1978, inquiry response times, batch update processing times and system controls were enhanced and history (retirement) file capabilities implemented.

Once the performance of the two DBMS applications was deemed satisfactory, work commenced on developing additional DBMS applications. Since mid-1979, six major systems have been implemented using a DBMS and very few problems were encountered because of our previous experience.

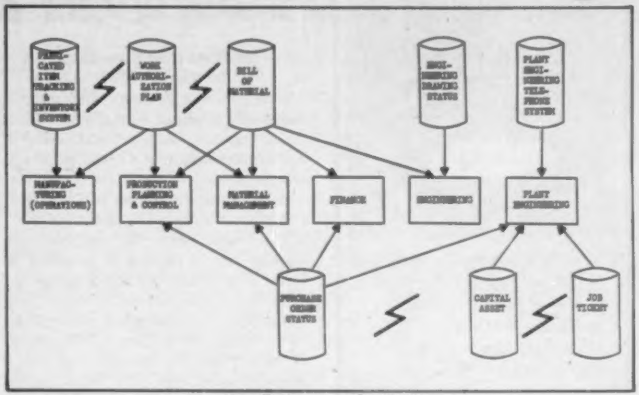
In November 1979, the Fabricated Item Tracking and Inventory system was implemented using a DBMS. This was the first DBMS application at Ingalls that provided on-line update capabilities. Since implementation, very few problems have been experienced. Recently the Work Authorization Plan system was also enhanced to provide on-line update capabilities.

Implementation of DBMS on-line update applications did present a problem in regard to backup and recovery procedures; however, it has been handled with relative ease. To date no problems have been encountered where it became difficult to recover due to system failures. This performance is attributed to a great deal of planning prior to implementation of DBMS on-line update applications.

Most Objectives Met

Ingalls has met a majority of its objectives in acquiring and implementing a DBMS. Hard-copy reporting has been reduced considerably through the use of on-line inquiries and data re-

(Continued on SR/36)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'Order!' the Cry? 'Data Dictionary' the Reply

By Dana R. Allison-Goeke
Special to CW

What are the qualities that make a software package attractive? Most would agree a package should assist in application maintenance and aid in application development, while maintaining cost-effectiveness and providing immediate benefits and success.

There will never be one software package that is capable of handling all processing needs, but a link can be established across systems such that data redundancy is decreased, duplication of programs and files is eliminated, standards are documented and easily accessible and people's development and maintenance efforts are not duplicated. A data dictionary proves to be such a link.

Data dictionaries provide the data documentation and intracorporate communication that are essential for successful software solutions.

What can extensive data documentation offer? It provides a greater awareness of the available data and, for a specific data item, indicates how and by whom data is accessed, who is responsible for the data and, more important, how the corporation is impacted if the data item changes (requiring maintenance efforts). A focal repository for documentation can facilitate timely answers to questions such as these.

Consider intracorporate communication. It is difficult for a large organization to ensure that maintenance and development efforts are not duplicated, that data is not duplicated and that maintenance strategies are accurate in the event of changing data. The questions of who owns what and what is owned by whom become very critical. Such an omniscient view is made possible with the aid of a data dictionary.

Barrage of Questions

Consider one small example: one data base which is accessed by one program. Then consider the barrage of questions that could be asked of this unrealistically simple situation. These would include:

- What is the data base name?
- What is the program name?
- What is the program's function?
- What records/items from the data base does the program access?
- Are the item names consistent between the data base and program or are aliases/synonyms used?
- What are the synonyms?
- How is the data base accessed?
- What programming language is used?
- Who wrote it?
- Who maintains it?

As an organization's information grows, so its information systems grow; thus, control management, documentation and impact of change become increasingly difficult to monitor. Using a data dictionary as a documentation/control tool allows an organization to collect information more easily. This facilitates corporate decision-making.

Programmer Productivity

As for how a data dictionary's management and documentation capabilities can assist in application development and maintenance, the core of these issues is programmer productivity.

Demands for new applications and for application changes will always exceed the available data processing staff and time schedules. If demands increase and staff number remains constant, then time becomes critical. If the time for each phase of maintenance and/or development is reduced, productivity increases.

Some of the phases involved in application development would be:

- Identifying the function of the application.
- Identifying the magnitude of the project — projecting the necessary resource requirements, for example.
- Estimating the time schedules.
- Coordinating the systems development phases such that efforts are not duplicated.

The more coordinated a project, the less time will be spent informing the left hand of what the right hand is doing. A data dictionary provides the coordination essential to trimming development time which, in turn, contributes to overall productivity.

Primary Function

One of a data dictionary's primary functions is the documentation of data. With accurate documentation, time that was previously spent locating data and determining data usage is now available for actual development. In short, knowing what data exists helps in projecting resource requirements and time schedules.

If the identification of an application's function is pursued without a coordinated development effort, poor communication between those developing the application and those using the application often results in "bad starts" and wasted time.

A staged and documented development allows for user/programmer checkpoints such that the programmer can ensure that the application he develops meets the user's needs. If the application's function is reaffirmed with each stage of development, the programmer is assured that the developed application is functional.

In addition to these benefits of a coordinated and staged development, there are the time benefits of knowing that efforts are not being duplicated since all efforts are documented within a central repository, the data dictionary.

In summary, the dictionary provides the capability of documenting the data, the systems requirements, the time schedules and the development phases such that a continuity between development stages exists, thereby reducing development time.

Managing Changes

Maintenance efforts are also trimmed by increased awareness of data and data usage, enhanced intracorporate communication and overall coordination of efforts. Maintenance is the result of change and the impact of the change can be critical to an organization.

A data dictionary offers an accurate method of determining the impact of changing requirements, data items and data relationships. With this information initially documented within the data dictionary, the dictionary can, in turn, provide an impact analysis of any change specified. This impact analysis can help in estimating the overall systems modifications required.

For example, consider the Zip Code. If the data item, "Zip Code," exists within an information system and its format is altered, what is the impact upon the information system? The data dictonary provides not only an analysis of the local impact (on a department of an organization), but of the global (corporate) impact as well.

A complete understanding of the corporate impact facilitates "better" planning of when to implement the change and is essential in understanding the true magnitude of the change. Determining the impact of change without the aid of a data dictionary is at best time-consuming and is likely to be inaccurate.

A data dictionary provides the capability of quickly and accurately determining the impact of any given change, thereby contributing to the timeliness of the change and the ability to immediately implement a consistent change across the information system.

In considering both development and maintenance efforts, one factor was allowed to be constant: staff. In the presence of new and/or changing personnel, however, a dictionary offers additional benefits. The dictionary increases productivity in a training capacity by acquainting the new person(s) with the data resources available and the person(s) to contact when additional information about the data is needed.

Active Dictionary

The data dictionary which has been discussed so far has been assumed to be passive — one that is primarily a report facility whereby information about one's data processing environment can be retrieved and/or updated. If an active data dictionary were to be considered, there would be additional programmer productivity aids.

The active data dictionary has the capabilities of the passive one, but in addition is integrated into the entire information flow. Active data dictionaries provide for data collection (collection bridges) and data generation (generation bridges).

Through collection and generation, standardization of approved naming conventions, data usage and data descriptions can be better maintained. This controlled standardization helps to establish a continuity of data items.

Generation of data structures also reduces maintenance and development time in that the need for data validation is eliminated and less code is written. The result is less chance of error. In short, everything that contributes to the coordination of systems development phases translates into less development time.

By its very nature, a data dictionary will ensure a more coordinated effort for both maintenance and development of applications.

Allison-Goeke is a member of Intel Corp.'s Commercial Systems Division's marketing staff in Austin, Texas, specializing in data base management.

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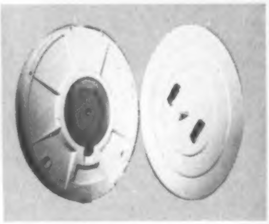

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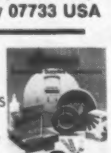

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Data Dictionary Benefits Defined From A to Z

By Frank P. Novak
Special to CW

Webster's definition of a dictionary is "a reference book listing alphabetically terms or names important to a particular subject or activity along with the discussion of their meanings and application." Its definition of a directory is "1. a book or collection of directions, rules or ordinances; 2. an alphabetical or classified list."

Applying these definitions to the data dictionary, the "subject" is the data management needs in the daily routines of running a corporation and the "activities" are the roles this data takes in making decisions.

With these definitions, a data dictionary system is a software package designed to help control and coordinate data resources. It is a repository of definitive information about data that a corporation needs to effectively utilize and maintain its data resources so that management can rely on the data in its managerial duties.

Multilevel Support

The scope of the data stored in a data dictionary covers all areas of the business and, therefore, needs the support of all levels of management. A basic assumption many users of a data dictionary make is that once it is installed, it automatically provides instant control and benefits to the corporation.

This assumption is true only if the data dictionary is faithfully maintained, evolves with the corporation and is supported by users and management alike. If the data is not kept timely and the effort to use it is mediocre, the benefits are not just reduced, but can be drastically hindering to the corporation.

When the data dictionary is correctly utilized, many benefits can be obtained. In the beginning, the benefits will be apparent in the MIS department and not in user departments.

As these benefits are applied in MIS, user departments will see the effects of these benefits in better system design, quicker project development and a more comprehensive and integrated system. In time, user departments will enjoy benefits directly — such as a complete awareness of all the data they have at their disposal and of how it is being utilized.

With this information, they can determine ways this data can be applied and eventually realize more expedient development of their own ad hoc reports utilizing the data stored in the data dictionary.

Benefits derived initially from the data dictionary fall into one of four categories: standards, system integrity, system development and documentation.

Standards:

- Can automatically be controlled.
- Allow controlled changes to programs, systems, files and data elements.
- Provide standard verification procedures.
- Provide standard definition and descriptions.
- Aid in resolution of terminology.

System Integrity:

- Reduces and points out redundancies.
- Indicates interrelationships of resources between systems.
- Provides auditors with information on system functions.
- Creates a repository of all system information and integration.
- Allows for utilization of standard data definition and descriptions.
- Reduces the amount of information that is lost because of turnover of staff personnel.

System Development:

- Utilizes a central repository of data to help reduce the time needed to gather information.
- Indicates impact on existing systems.
- Utilizes descriptions of data elements to reduce program development time.
- Uses standard verification procedures.
- Provides the means to centally develop test data.

Documentation:

- Creates a central repository of data.
- Provides for system, subsystem, program and file documentation.
- Provides report descriptions.
- Provides for record layouts.
- Identifies users of data resources.
- Provides consistent documentation.

In summary, the benefits derived from the data dictionary are very diversified and, when administered correctly, will form a very powerful tool for management. This tool can be used by all levels of management and its staff to perform required tasks.

Facilities Categories

The facilities of a data dictionary can be separated into three categories, report, control and excerpt:

The reporting facility is the vehicle used to indicate the contents of the data stored in the data dictionary. It shows the interrelationships of the data and their attributes.

There are many types of reports that can be produced, so at this time it is better to just define the three areas into which these reports fall. The first area, detail reporting, consists of consolidated reports on individual data critieria such as systems, files, users and data elements.

The second area, cross-reference reporting, is used to indicate interrelationships of the data stored in the data dictionary, such as files to programs; programs to systems; and users to systems.

The last area, summary reporting, is used to summarize data entities stored in the data dictionary. This facility is a very powerful tool that can be used by all levels of management.

The control facility, a very powerful vehicle in the MIS environment, can be used to detect MIS standard exceptions, user authority and documentation requirements.

Standards exceptions can take the form of making sure standards validation procedures are being followed for specific data criteria during update functions.

User authority is the ability to give control of updating data to specific areas that will be held responsible for that data, and in the data base environment, of restricting access to the ability to view or update the data base.

The documentation requirements will be in the form of an automatic function of documenting specific systems and system components, such as automatic program code documentation. These control facilities will help to standardize and maintain a uniform environment which, in turn, will increase productivity and confidence.

The excerpt facility is where data is directly retrieved or utilized from the data dictionary. Using this facility, code can be created from the data dictionary and copied directly into programs.

Code can take the form of work areas, file definitions, record descriptions or even procedure code to perform specific tasks. Utilizing the data directly will create test data from descriptions stored in the data dictionary or create interactive fields for on-line query languages.

A last feature of the facility is the ability to automatically copy documentation into source code. These features will help enforce standards and reliability by extracting from a standard pool of data.

Potential Users

A data dictionary user is anyone responsible for providing or needing to use data dictionary data. Users can consist of both MIS and non-MIS personnel, at either the staff or management level.

In the MIS area, all levels will use the data dictionary in one way or another.

(Continued on SR/36)

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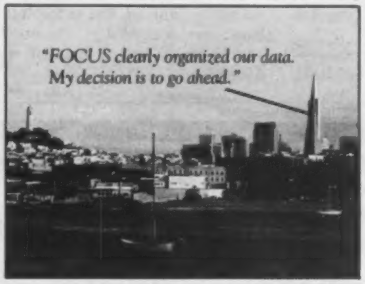
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Data Base Integrity Protected

Test Data Bases Expedite Application Design

By James Bando
And Paul Meier
Special to CW

MADISON, Wis. — An objective of every organization is to put an application that is well-tested into production. Applications developed using traditional file access methods are difficult to test thoroughly, but when using a data base management system (DBMS), it is often more complicated because of the many interrelationships between the data items.

At Verex Assurance, Inc. here, the operating environment consists of running a production DOS/VS operating system and a testing DOS/VS operating system under VM on an IBM 3031. Verex uses Software AG's Adabas, as the DBMS. The on-line production data base contains four major files and several minor files totaling about 1.1 million records (600M bytes). The off-line data base is comprised of four major files containing about 500,000 records (200M bytes).

As more fields were added to files and more files were added to the data bases, it became increasingly difficult to maintain a test data base that contained up-to-date data representative of the production environment. This was due in part to the difficulty in moving a representative amount of data from the production data bases to the test data base.

In addition, all of the files on the production data bases are interrelated, making it necessary to recode programs to extract the records every time files or fields were added or changed. Consequently, the test data base was not often maintained, leaving applications to be tested using the production data bases, a very dangerous practice, or inadequately tested using the test data base. Verex realized that there were significant problems in this area.

Verex decided to implement a formal Test Data Base System (TDBS). After researching other organizations, it was determined that they were little better off. So, Verex decided to develop its own.

There were several objectives to be accomplished by the TDBS:

- Provide a good representation of the production environment.
- Provide up-to-date data.
- Make the test data easily available to the applications staff.

The system developed consisted of three parts:

- Three active test data base areas. These are the disk areas allocated to contain the test data bases. This allows up to three test data bases to be available at all times.
- An unlimited number of test data bases backed up on tape. The application programming staff keeps track of their own test data bases. They are restored on one of the three test data base areas as needed.
- Six procedures to maintain the test data bases.

One of the active test data base areas contains a standard test data base that can be used to test many applications. The other two are available for the application programming staff to create specialized test data bases. This keeps the standard test data base clean. Specialized test data bases can be used to test update programs or create test data bases for a new version of the DBMS without impacting other testing.

The application programming staff is allowed to have an unlimited number of test data bases backed up on tape. When needed, they can be restored to one of the two special test data base areas for use. Of course, this means only two at a time can be used.

The six procedures are used to manipulate the test data bases. They consist of manual actions, programs written at Verex and utilities distributed with Adabas. The procedures are controlled by data base administration and are run upon requests from the application staff. The procedures are:

- Set up a data base. This allows a new test data base to be created from any existing production or test data base. Specific records and files can be selected to test specific applications, or records can be selected randomly. The main component of this procedure is a program that selects data from any file. It needs no reprogramming when files change characteristics.
- Select data. This allows files to be replaced on a test data base with a new test file; files to be added to an existing test data base; and sequential extract files to be created from any data base to be used in a test or production environment.
- Modify data. This allows data on any test data base to be modified and is especially useful for testing new applications for which there is no data currently available.
- Maintenance. This allows maintenance to be done to any test data bases, whether active or backed up. Maintenance includes adding new fields to files and installing a new version of the DBMS.
- Backup. This allows an active test data base to be backed up and lets many users use the same active data base areas on disk for their data base.
- Restore. This allows a backed-up test data base to be restored to one of the active test data base areas at any time.

The system has been in production for only a short time and has shown encouraging results. All of the objectives have been met. The system uses no more resources than were used before.

Bando is technical support manager, in charge of systems programming and data base administration, at Verex Assurance, Inc. in Madison, Wis. Meier is a data base analyst for the mortgage and insurance firm.

Dictionary Benefits Defined

(Continued from SR/35)

Project managers can use it to keep track of all their systems and their statuses. System analysts will use it for documenting systems and system components and for evaluating information when designing new systems. Programmers will be utilizing it to copy code into their programs.

If additional attributes are added to entities stored in the data dictionary, operations can use it to help in scheduling. Upper management can use it to gather information on projects and systems needed for presentations.

Non-MIS users are DP auditors; user department personnel responsible for specific systems; and business analysts.

DP auditors will use the data dictionary whenever they need information on systems, programs or controls. User departments can use the data dictionary to keep control, review, document and monitor systems. Business analysts can use it in research in developing ideas of using or enhancing the data they have.

It is not the intent of this article to portray a data dictionary as a quick solution to many of the problems all MIS departments have. The installers of the data dictionary in a corporation have numerous jobs ahead of them. They have to develop data dictionary standards, procedures and schedules that will efficiently utilize the data dictionary and conform to the MIS standards within the corporation.

They have to win the support and enthusiasm of the MIS staff, which will now use the data dictionary. Finally, they have to deal with the political entanglements that occur when crossing departmental boundaries when data is to be placed into the data dictionary.

Novak is data base designer analyst for Cadence Industries Corp. in West Caldwell, N.J.

Shipyard Charts Data Base

(Continued from SR/33)

dundancy has been eliminated in DBMS applications.

In 1979 a Plant Engineering Maintenance system was successfully implemented and through its use, the plant engineering maintenance department was able to save a considerable amount of money annually. This multiple data base system helped the department place first in the American Institute of Plant Engineers' "Outstanding Plant Engineering Program of the Year" in the large plant category.

Data integrity has greatly increased by elimination of data redundancy and by provision of timely information to DBMS system users. Through the use of DBMS applications the users are able to obtain immediately, via inquiries, timely information.

Information Systems' computer configuration consists of two IBM 370/-158 processors coupled that run under MVS JES3. More than 100 terminals tie into the mainframes using TSO and CICS.

Davidson is manager of business applications at Ingalls Shipbuilding, Inc. in Pascagoula, Miss.

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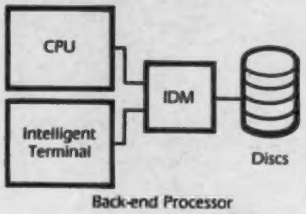

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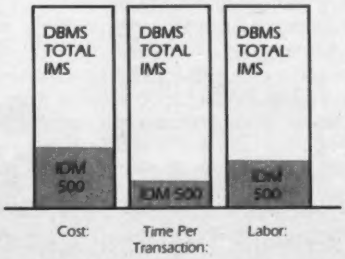

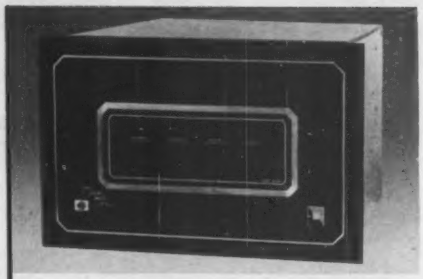

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FCC Investigating Bell's Unbundling Of Service Charges

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T's practice of charging separately for servicing private-line and Dataphone Digital Service (DDS) customers who provide their own terminals became the subject of a Federal Communications Commission (FCC) investigation early this month.

The investigation was launched after Aeronautical Radio, Inc. (Arinc), which operates a large private-line communications network for most of the nation's airlines, protested a 600% increase in those charges. The increase, which the commission allowed to become effective this month, raises per/-visit charges from $11.35 to $80 for private-line users and from $27 to $80 for DDS customers whenever an AT&T repair technician finds customer-provided equipment responsible for service difficulties.

The FCC said AT&T's practice of bundling service charges for its own private-line and DDS terminals precludes ascertaining whether "unreasonable or unlawfully discriminatory charges are being levied against non-AT&T equipment customers for the

(Continued on Page 58)

Battle Looming Over Custom Calling II

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Another bitter battle appears to be developing between AT&T and providers of on-line information services. The subject this time is Custom Calling II, a computer-based voice store-and-forward service Bell recently unveiled in Pennsylvania and plans to tariff in several other states during the coming year.

Last April, in its "final" Second Computer Inquiry decision, the Federal Communications Commission (FCC) explicitly listed such offerings as one kind of "enhanced" service Bell would have to provide through a separate subsidiary. Early this month, in a letter to FCC Chairman Charles Ferris, the phone company asked the commission to reinterpret its definition so that Custom Calling II can be offered directly by AT&T operating companies.

The new service is an "integral part" of the telephone network, AT&T Vice-President James R. Billingsley told Ferris. The value of Custom Calling II comes in part, he added, "from the universal availability of the network." Also, the phone company has committed $70 million to development of Custom Calling II ser-

(Continued on Page 60)

Users of CRT Terminals Blast Burroughs' Technical Support

By Brad Schultz
CW Staff

DELRAN, N.J. — Users rated several CRT terminal models low in technical support, but gave high marks for overall performance to a number of models in a recently published Datapro Research Corp. report, "All About Alphanumeric Display Terminals."

Burroughs Corp. was blasted by 21 users of 1,099 terminals in the technical support category of Datapro's survey, which assigned four points for "excellent," three points for "good," two points for "fair" and one point for poor. Burroughs' TD 800 series earned a 1.3 average in technical support from three users of 347 terminals — the worst average for any category the survey considered.

Burroughs' TD 700 and TD 830 series terminals had averages of 2.0 and 2.4, respectively, in technical support. However, the TD 700 series also won perfect scores for display clarity and keyboard feel and usability — getting 4.0 averages in those categories from four users of 181 units — as well as a 3.8 average in ease of operation.

Hazeltine Corp.'s Model 2000 terminal pulled a 1.8 average for technical support. In that category, 2.0 averages were tallied for Applied Digital Data Systems, Inc.'s (Adds) Regent 100; unspecified Digital Equipment Corp. models; unspecified Teleray, Inc. models; and Telex Terminals' TC 277.

Other terminal models with technical support averages less than 2.5 were DEC's VT-05 and VT-52; unspecified Hazeltine models; unspecified ITT Courier Terminal Systems, Inc. models; Univac's Uniscope

(Continued on Page 60)

Microform Processor Family Resolves Net Incompatibilities

MOUNTAIN VIEW, Calif. — A series of processors designed for the management of remote networks has been developed by Microform Data Systems, Inc.

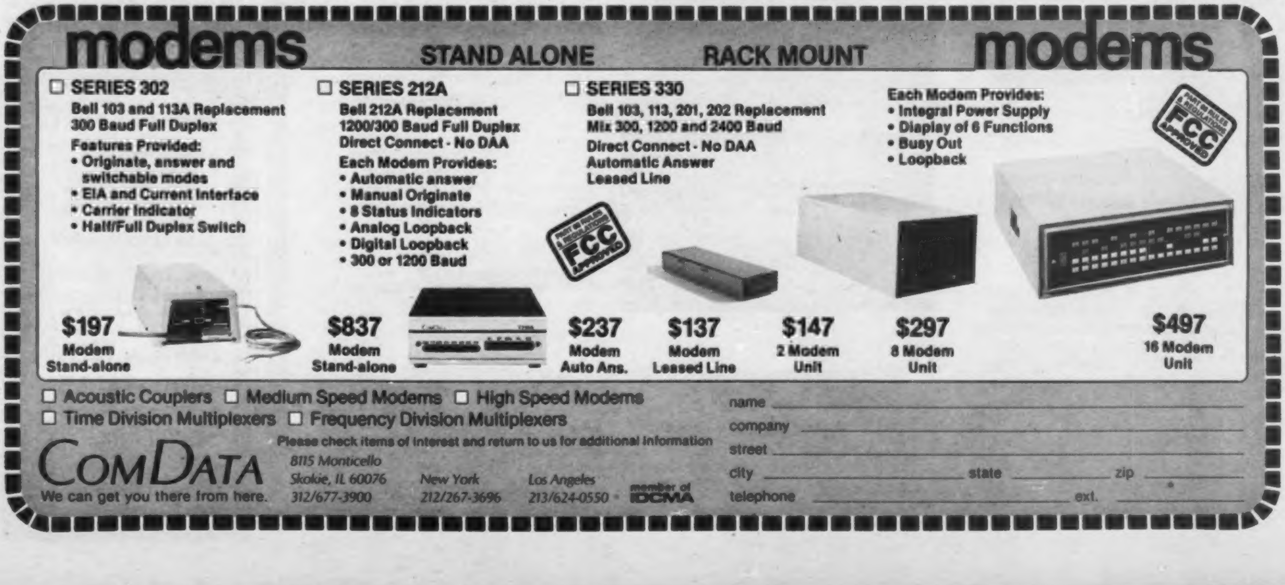
The Icot 257 series' microprocessor-per-line architecture and Icobus busing are said to enable users to solve network incompatibilities, build "smarter" networks and match processing power to network size and needs. Icobus provides interconnection, scheduling and data transfer between microprocessor ports, thereby acting as an intelligent link between any two network lines, according to the vendor.

Protocols exchangeable through Icobus include Bisync, Uniscope, Ascii Teletype, X.25/HDLC, SNA/SDLC, Pars and P1024. Other protocols are available by request.

As a remotely positioned communications processor, the 257 reportedly performs such network management functions as polling, message editing and processing, queuing, priority scheduling, diagnostics and error recovery, statistics gathering and security. The 257 accommodates data rates up to 9,600 bit/sec and accommodates up to 13 full duplex I/O lines on the standard unit, or more optionally.

There are three levels of firmware within the 257 series: physical control level, message protocol and application level. Hardware for the 257 Series includes 48K bytes of random-access memory (RAM) system memory, timing boards and up to 13 communications processor boards. Each processor board has 6K to 12K bytes of read-only memory (ROM) or programmable ROM, 2K bytes of RAM, an interrupt processor and a serial line interface.

Prices range from $13,000 to $30,000 from the vendor at 830 Maude Ave., Mountain View, Calif. 94043.



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DEC Enhances DMC11 Controller

MAYNARD, Mass. — An enhanced version of Digital Equipment Corp.'s DMC11 communications controller has been announced by the firm.

The DMR11 is a synchronous unit able to interface to the new EIA RS449, RS423 and RS422 standard communication channels as well as the existing RS-232-C standard, according to the firm. The microprocessor-controlled unit also conforms to the latest release of the Digital Data Communications Message Protocol (DDCMP) Version 4.0.

The DMR11 is said to provide a point-to-point link between PDP-11 computers based on Unibus architecture and also VAX-11/780 minicomputers, according to the spokesman. The controller can be configured for high-speed operation using coaxial, biaxial or triaxial cables for computers located in the same facility.

The DMR11 is software-compatible with the DMC11 for such DEC software systems as VAX/VMS, RSX-11M, -11M-Plus, -11S and RSTS/E operating systems. It is also compatible with PDP-11 and VAX-11/780 versions of Decnet. Prices start at $4,200 from the company in Maynard, Mass. 01754.

Micro-Based Unit Allows Store-and-Forward Tasks

ROCHESTER, N.Y. — Sykes Datatronics, Inc. has unveiled a microprocessor-based unit for data store-and-forward applications, paper tape replacement and data logging from instrumentation.

The Comm-Stor I unit is compatible with any asynchronous RS-232 terminal, printer modem or instrument and is expected to fill the needs of users not served by the larger and more sophisticated Comm-Stor II family.

As a store-and-forward device, the Comm-Stor I unit allows retail outlets, warehouses, banks or any business relying on the slow, steady collection of data, to enter and edit transactions off-line. A day's transactions can then be transmitted at one time.

As a paper tape replacement, the unit is said to offer an 8-in. diskette in place of "hundreds of feet" of tape.

As a data logger, the Comm-Stor I can receive batched data at speeds up to 9,600 bit/sec and features automatic power failure recovery and an end-of-disk alarm feature.

The Comm-Stor I unit costs $2,395 from the firm at 375 Orchard St., Rochester, N.Y. 14606.

Bell Charges Investigated

(Continued from Page 57)

performance of similar maintenance functions. The commission pointed out that AT&T has not filed an increase in its bundled rates corresponding to the one proposed for users of non-Bell terminals.

This may indicate that "comparable charges are not being assessed," the commission said, but in any event, "the ability to determine whether and to what extent this is the case is impeded by AT&T's selective rate element bundling practice which prevents tracking of maintenance function costs."

The FCC added that it must make sure "tariff practices such as selective imposition of a separate maintenance charge do not become a vehicle against customers who provide their own equipment."

Initial comments from parties that wish to participate in the investigation (Docket 80-604) are due Nov. 7.

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Concentrator Selects Host, Multiplexes, Routes

CHERRY HILL, N.J. — An intelligent network data concentrator said to provide multitrunk statistical multiplexing, alternate routing and host computer selection capabilities has been introduced by Infotron Systems Corp.

The Supermux 790 also reportedly offers centralized control of all resources in multinode networks and ensures error-free data transmission.

The Supermux 790 can be configured in various multipoint network arrangements with other 790 units and with Infotron Supermux 480, -680 and -780 statistical multiplexers, according to the firm.

The unit can be expanded in size and capability to handle switching, port selection and contention. It accommodates any combination of synchronous and asynchronous, dial-up and dedicated inputs at speeds up to 9,600 bit/-sec, the vendor claimed.

Using statistical techniques, the unit concentrates up to 448 inputs for transmission to as many as eight different remote nodal locations at speeds as high as 72K bit/sec.

From the 790 console, an operator can reroute traffic, control all channel and link parameters, monitor input and initiate test and diagnostic routines to pinpoint problems in local or remote, unattended sites.

The Supermux 790 also accumulates system statistics that provide the quantitative data necessary to plan system expansion.

For the unit, cabinet, controller nest with power supply, expansion nest with power supply, on link module, 20 channels and a dual interface module, the price is $14,600 from the firm at the Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Supermux Gains Modem

CHERRY HILL, N.J. — Infotron Systems Corp. has integrated a full-duplex 4,800- and 9,600 bit/sec modem with its 32-channel Supermux 680 statistical multiplexer.

There is no external box, no cable and no division of responsibility, the firm said. The microprocessor-controlled modem operates over four-wire Type 3002 unconditioned telephone lines and features an adaptive equalizer that automatically compensates for changing line conditions.

The 9,600 bit/sec model also includes provisions for automatic fallback to 7,200 or 4,800 bit/sec.

The multiplexer provides error protection, priority control, data compression, flow control, down-line loading and hard-copy system status reports. Inputs may be any combination of synchronous and asynchronous, dial-up and dedicated with mixed protocols and speeds to 9,600 bit/sec.

The Supermux 680 uses statistical techniques to transmit only active data inputs, conserving bandwidth so that the throughput is double or better that of conventional multiplexers, the firm claimed. Every input has a priority/no priority switch that establishes the priority of that input for bandwidth on the high-speed output line, which also increases throughput, the vendor noted.

Users can reconfigure remote, unattended units from the central site and monitor system status with front-panel displays.

The multiplexer costs $4,000 from Infotron Systems Corp., Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Tran Multiplexers Now Sold in U.S.

MARINA DEL REY, Calif. — Tran Telecommunications Corp. is now marketing its multiplexers in the U.S.

The models M2111-1 to -4 Multitran multiplexers are built to support all common input speeds, interface types and trunk speeds. In addition, they are available in configurations to support as few as two low-speed channels and can be upgraded to support large numbers of input channels with aggregate data rates as high as 460K bit/sec., the vendor claimed.

The M2111-5 handles up to 460K bit/sec. and trunk rates of 1.5M bit/-sec. Other features include synchronous and asynchronous inputs and multilevel loopback testing.

The products range from $4,000 to $8,000, depending on configuration, the vendor said from 2500 Walnut Ave., Marina Del Rey, Calif. 90291.

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CRT Terminal Users Blast Burroughs' Support

(Continued from Page 57)

200; and 2,872 units unidentified by 59 users.

Overall Performance

Overall performance, however, was a different story.

Perfect 4.0 averages went to Hewlett-Packard Co.'s 2640 and 2645 and the Teleray 1061 in that category. Not far behind were unspecified Tektronix, Inc. models (3.9); HP's 2621 (3.8); ITT Courier's 770/7750s (3.8); Ramtek Corp.'s 8025/8025As (3.8); Datagraphix, Inc.'s 132A/-132B (3.7); DEC's VT-05 (3.7) and VT-100 (3.7); all Delta Data Systems Corp. models (3.7); the IBM 3276 (3.7); and Tektronix 4023 (3.7).

In overall performance, 209 IBM users gave their 7,869 terminals a collective average of 3.5. The collective averages for IBM were greater than 3.0 in every category.

The Datapro survey's maintenance service category gave Burroughs' TD 700 series a tie with the Telex TC 277 for last place at 2.0 and the unspecified group of Teleray terminals did not fare much better with a 2.3 maintenance service average. In contrast, HP's 2640 scored a perfect 4.0 average in the category and 3.7 averages went to the Datagraphix 132A/132B group and Tektronix's 4023.

Besides reaping a low average in technical support, Univac's Uniscope 200 had measly 2.4 averages in the categories of keyboard feel and usability and hardware reliability.

In the latter category, the unspecified Telerays also had a 2.4 average, but users showed great confidence in the reliability of the Datagraphix 132s, DEC VT-100, HP 2640, IBM 3270s, the Tektronix groups and Teleray's 1061.

In display clarity, Honeywell, Inc.'s VIP terminals had mediocre averages from 11 users of 209 units, while high averages went to a number of competitive products

Three Categories

In its $15 report, Datapro noted that CRT terminals fall into three general categories: dumb, smart and user-programmable [CW Special Report, March 31]. Usually compatible with Teletype Corp. teleprinters, dumb terminals offer a limited number of functions, Datapro observed.

Smart terminals, on the other hand, offer extended functions such as editing and formatted data entry, the report said. User-programmable terminals, which are often called intelligent (as opposed to smart), feature software support.

The report's user survey presents usable responses from 308 users of 18,119 installed CRT terminals, Datapro stated. Received by March 1, the responses totaled 549 because many users reported on more than one model.

Datapro asked the users whether their terminals served as plug-compatible replacements for another vendor's terminals. Of the 549 responses, 276 indicated emulation of either Teletype's Model 33 and 35 teleprinters or one of the following terminal families: IBM 3270, IBM 2260, Burroughs TD, Honeywell VIP and DEC VT.

Among single-station configurations, nearly two-fifths of the represented terminals have remote connections via communications lines with host mainframes, Datapro found. But less than 30% of clustered configurations had remote links. These clusters averaged five terminals per controller, the report stated.

Datapro is located at 1805 Underwood Blvd., Delran, N.J. 08075.

USERS' RATINGS OF ALPHANUMERIC DISPLAY TERMINALS

Display Supplier and Model	No. of User Responses	No. of Displays in Use	Weighted Averages and Response Counts: Overall Performance					Ease of Operation					Display Clarity					Keyboard Feel and Usability					Hardware Reliability					Maintenance Service					Technical Support				
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
ADDS Regent 100	3	19	3.0	1	2	0	0	2.7	1	1	0	1	3.7	2	1	0	0	2.7	1	1	0	1	3.3	2	0	1	0	3.0	1	0	1	0	2.0	0	1	0	1
ADDS, others and unspecified	8	77	3.4	3	5	0	0	3.3	3	4	1	0	3.5	4	4	0	0	3.4	3	5	0	0	3.5	4	4	0	0	3.1	2	5	1	0	2.9	1	5	2	0
Subtotals	11	96	3.4	4	7	0	0	3.1	4	5	1	1	3.5	6	5	0	0	3.2	4	6	0	1	3.5	6	4	1	0	3.1	3	4	3	0	2.7	1	6	3	1
Beehive, all models	6	944	3.3	2	4	0	0	2.5	2	3	1	0	3.3	2	4	0	0	3.3	2	4	0	0	3.0	2	2	2	0	3.2	1	4	0	0	2.8	1	3	2	0
Burroughs TD 700 Series	4	181	3.3	1	3	0	0	3.8	3	1	0	0	4.0	4	0	0	0	4.0	4	0	0	0	3.0	1	2	1	0	2.0	0	0	4	0	2.0	0	0	4	0
Burroughs TD 800 Series	3	367	3.0	0	3	0	0	2.7	0	2	1	0	3.0	1	1	1	0	3.0	1	1	1	0	2.7	0	2	1	0	2.7	1	0	2	0	1.3	0	0	1	2
Burroughs TD 830 Series	14	571	3.5	7	7	0	0	3.4	7	6	1	0	3.3	5	8	1	0	3.1	4	8	2	0	3.2	5	7	2	0	2.8	3	9	1	1	2.4	1	5	6	2
Subtotals	21	1,099	3.4	8	13	0	0	3.4	10	9	2	0	3.4	10	9	2	0	3.3	9	9	3	0	3.1	6	11	4	0	2.6	3	9	7	2	2.1	1	5	11	4
Datagraphix 132 A/B	3	5	3.7	2	1	0	0	3.0	1	1	1	0	4.0	3	0	0	0	3.0	2	0	0	1	3.7	2	1	0	0	3.7	2	1	0	0	3.3	2	0	1	0
Datamedia, all models	8	16	3.6	5	3	0	0	3.6	5	3	0	0	3.4	4	3	1	0	3.3	2	6	0	0	3.5	4	4	0	0	3.4	4	3	1	0	3.1	4	2	1	1
Datapoint, all models	6	98	3.3	2	4	0	0	3.7	4	2	0	0	3.2	1	5	0	0	3.2	1	5	0	0	3.2	2	3	1	0	3.5	4	1	1	0	3.6	3	2	0	0
DEC VT-05	3	34	3.7	2	1	0	0	3.7	2	1	0	0	3.0	1	1	1	0	2.7	1	0	2	0	3.3	1	2	0	0	2.7	1	1	0	1	2.3	1	0	1	1
DEC VT-52	6	47	3.5	4	1	1	0	3.3	3	2	1	0	3.5	3	3	0	0	3.3	2	4	0	0	3.3	4	1	0	1	2.8	1	3	2	0	2.3	0	3	2	1
DEC VT-100	9	22	3.7	6	3	0	0	3.6	6	2	1	0	3.7	6	3	0	0	3.7	6	3	0	0	3.8	7	2	0	0	3.2	4	3	2	0	3.0	4	2	2	1
DEC, others and unspecified	3	10	3.3	1	2	0	0	3.3	1	2	0	0	3.3	1	2	0	0	3.3	1	2	0	0	3.5	1	1	0	0	3.0	1	1	1	0	2.0	0	1	0	1
Subtotals	21	103	3.6	13	7	1	0	3.5	12	7	2	0	3.5	11	9	1	0	3.4	10	9	2	0	3.6	13	6	0	1	3.0	7	8	5	1	2.6	5	8	5	4
Delta Data, all models	3	34	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	3.3	2	0	1	0	3.0	1	0	1	0	2.7	1	0	2	0
General Terminal (Infoton) 100	4	31	3.3	1	3	0	0	3.3	1	3	0	0	3.3	2	1	1	0	3.0	1	2	1	0	3.3	1	3	0	0	3.0	1	2	1	0	2.7	0	2	1	0
General Terminal, others and unspecified	4	15	3.0	1	2	1	0	3.3	1	3	0	0	3.0	1	2	1	0	2.5	1	1	1	1	2.8	1	2	0	1	3.3	1	2	0	0	3.3	1	3	0	0
Subtotals	8	46	3.1	2	5	1	0	3.3	2	6	0	0	3.1	3	3	2	0	2.8	2	3	2	1	3.0	2	5	0	1	3.1	2	4	1	0	3.0	1	4	1	0
Hazeltine 1500 Series	8	806	3.1	2	5	1	0	2.9	2	4	1	1	3.3	4	2	2	0	2.6	1	4	2	1	2.8	1	5	1	1	2.8	1	4	3	0	2.7	1	4	1	1
Hazeltine 2000	4	157	3.0	0	4	0	0	2.8	0	3	1	0	2.5	0	2	2	0	2.8	0	3	1	0	2.5	0	2	2	0	3.0	1	2	1	0	1.8	0	1	1	2
Hazeltine, others and unspecified	8	210	2.8	0	6	2	0	3.4	4	3	1	0	2.9	2	3	3	0	3.1	2	5	1	0	2.8	0	7	0	1	2.6	0	5	1	1	2.4	0	4	2	1
Subtotals	20	1,273	3.0	3	15	3	0	3.1	6	10	3	1	3.0	6	7	7	0	2.9	3	12	4	1	2.7	1	14	3	2	2.7	2	11	5	1	2.4	1	9	4	4
Hewlett-Packard 2621	4	32	3.8	3	1	0	0	3.3	1	3	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.0	1	2	1	0	3.5	2	2	0	0	3.0	1	2	1	0
Hewlett-Packard 2640	4	17	4.0	4	0	0	0	3.8	3	1	0	0	3.8	3	1	0	0	3.8	3	1	0	0	3.8	3	1	0	0	4.0	4	0	0	0	3.5	2	2	0	0
Hewlett-Packard 2645	5	127	4.0	5	0	0	0	3.6	3	2	0	0	3.8	4	1	0	0	3.8	4	1	0	0	3.6	3	2	0	0	3.6	4	0	1	0	3.0	1	3	1	0
Subtotals	13	176	3.9	12	1	0	0	3.5	7	6	0	0	3.7	9	4	0	0	3.7	9	4	0	0	3.5	7	5	1	0	3.7	10	2	1	0	3.2	4	7	2	0
Honeywell VIP 7700	6	174	2.8	1	3	2	0	2.8	0	5	1	0	2.5	1	1	4	0	2.7	0	4	2	0	3.3	2	4	0	0	3.2	1	5	0	0	3.0	1	4	1	0
Honeywell VIP, other and unspecified	5	35	3.2	2	2	1	0	3.0	2	1	2	0	2.4	1	1	2	1	3.0	2	1	2	0	3.2	2	2	1	0	3.0	1	3	1	0	2.6	1	2	1	1
Subtotals	11	209	3.0	3	5	3	0	2.9	2	6	3	0	2.5	2	2	6	1	2.8	2	5	4	0	3.3	4	6	1	0	3.1	2	8	1	0	2.8	2	6	2	1
IBM 3275	12	149	3.3	3	9	0	0	3.2	2	10	0	0	2.8	0	10	2	0	3.1	2	9	1	0	3.2	2	10	0	0	2.8	0	10	2	0	3.1	2	9	1	0
IBM 3276	19	125	3.7	14	5	0	0	3.2	6	10	3	0	3.7	13	6	0	0	3.5	11	6	2	0	3.5	12	5	2	0	3.3	6	12	1	0	3.1	6	9	4	0
IBM 3277	70	2,982	3.5	36	32	2	0	3.4	33	35	2	0	3.2	22	38	10	0	3.4	32	34	3	1	3.5	37	30	3	0	3.3	29	30	11	0	3.2	28	29	10	2
IBM 3278	85	4,983	3.6	54	31	0	0	3.2	28	47	10	0	3.5	42	41	2	0	3.2	31	39	12	2	3.6	51	31	3	0	3.3	36	42	6	2	3.0	24	43	14	4
IBM 3270, other and unspecified	9	214	3.6	5	4	0	0	3.1	1	8	0	0	3.4	4	5	0	0	3.3	3	6	0	0	3.7	6	3	0	0	3.2	2	7	0	0	3.4	3	5	0	0
IBM, others and unspecified	14	226	2.9	5	3	5	1	3.1	4	8	1	1	2.9	5	3	2	2	2.9	2	5	3	0	2.7	4	4	4	2	2.9	1	10	2	0	2.7	2	7	2	2
Subtotals	209	7,869	3.5	117	84	7	1	3.3	74	116	16	1	3.3	88	100	16	2	3.3	81	99	21	3	3.5	112	83	12	2	3.2	72	111	22	2	3.1	65	108	31	8
ITT Courier 270/2700/2750	21	1,003	3.2	5	15	1	0	3.2	6	14	1	0	3.2	8	10	3	0	3.3	9	9	3	0	3.0	4	12	5	0	3.0	5	12	4	0	2.9	4	11	6	0
ITT Courier 7700/7750	4	35	3.8	3	1	0	0	3.8	3	1	0	0	3.8	3	1	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.5	2	2	0	0
ITT Courier, others and unspecified	7	167	3.1	3	2	2	0	3.1	1	6	0	0	3.3	2	5	0	0	3.6	4	3	0	0	2.7	2	3	0	2	2.6	1	3	2	1	2.3	0	4	1	2
Subtotals	32	1,205	3.3	11	18	3	0	3.3	10	21	1	0	3.3	13	16	3	0	3.4	15	14	3	0	3.0	8	17	5	2	3.0	8	17	6	1	2.8	6	17	7	2
Lear Siegler ADM-3A	14	227	3.5	7	7	0	0	3.4	6	8	0	0	2.9	3	7	4	0	3.1	4	7	3	0	3.5	8	5	1	0	3.0	4	4	2	1	2.8	3	4	4	1
Lear Siegler, others and unspecified	6	34	3.3	2	4	0	0	3.3	2	4	0	0	3.3	2	4	0	0	3.0	1	4	1	0	3.2	2	2	1	0	2.8	1	2	2	0	2.8	1	1	2	0
Subtotals	20	261	3.5	9	11	0	0	3.4	8	12	0	0	3.1	5	11	4	0	3.1	5	11	4	0	3.4	10	7	2	0	2.9	5	6	4	1	2.8	4	5	6	1
Memorex 1377	22	402	3.3	13	7	2	0	3.5	11	11	0	0	3.5	12	9	1	0	3.3	7	14	1	0	3.5	14	6	2	0	3.0	5	11	4	1	2.9	3	13	3	1
NCR 796 Series	7	308	3.1	1	6	0	0	3.0	1	5	1	0	3.1	2	4	1	0	2.9	1	4	2	0	3.3	3	3	1	0	3.3	3	3	1	0	2.6	1	3	2	1
Northern Telecom (Sycor), all models	5	117	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0	3.3	1	3	0	0	2.6	1	1	3	0
Ramtek (Cimron) 8025/8025A	4	75	3.8	3	1	0	0	3.5	2	2	0	0	3.8	3	1	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.3	2	0	1	0
Tektronix 4023	3	46	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	3.0	0	1	0	0
Tektronix, others and unspecified	8	8	3.9	7	1	0	0	3.3	2	6	0	0	3.8	6	2	0	0	3.0	0	8	0	0	3.8	6	2	0	0	3.5	5	2	1	0	3.3	5	1	1	1
Subtotals	11	54	3.8	9	2	0	0	3.4	4	7	0	0	3.7	8	3	0	0	3.2	2	9	0	0	3.7	8	3	0	0	3.5	7	3	1	0	3.2	5	2	1	1
Teleray 1061 (10 M)	3	22	4.0	3	0	0	0	3.3	1	2	0	0	3.0	2	0	0	1	3.3	2	0	1	0	3.7	2	1	0	0	3.3	1	2	0	0	3.5	1	1	0	0
Teleray, others and unspecified	5	83	2.6	0	4	0	1	3.0	0	5	0	0	2.8	0	4	1	0	3.2	1	4	0	0	2.4	1	1	2	1	2.3	1	0	2	1	2.0	0	1	1	1
Subtotals	8	105	3.1	3	4	0	1	3.1	1	7	0	0	2.9	2	4	1	1	3.3	3	4	1	0	2.9	3	2	2	1	2.7	2	2	2	1	2.6	1	2	1	1
Teletype 40 Series	14	198	3.5	7	7	0	0	3.4	5	7	2	0	3.4	6	7	1	0	3.0	4	7	2	1	3.3	5	8	1	0	3.2	5	8	0	1	2.8	4	5	3	2
Telex TC 277	8	533	2.9	0	7	1	0	3.1	1	7	0	0	3.1	1	7	0	0	3.0	1	5	1	0	2.9	1	5	2	0	2.0	1	0	4	2	2.0	0	2	3	2
Univac Uniscope 200	5	96	3.0	1	3	1	0	3.4	3	1	1	0	3.2	1	4	0	0	2.4	0	2	3	0	2.4	1	1	2	1	2.8	2	0	3	0	2.2	0	2	2	1
Subtotals	16	355	3.0	6	8	2	0	3.5	9	6	1	0	3.4	6	10	0	0	2.9	4	7	4	1	2.8	6	3	5	2	2.9	5	4	7	0	2.3	0	7	7	2
Wordstream (Genesis One) 677	14	276	3.6	9	5	0	0	3.6	9	4	1	0	3.4	5	9	0	0	3.4	6	7	1	0	3.3	7	6	1	0	3.1	4	8	2	0	3.5	6	7	0	0
All others	59	2,872	3.1	19	29	10	1	3.1	19	28	9	3	3.2	23	27	9	0	3.0	10	38	10	1	2.8	17	18	18	6	2.7	9	25	15	6	2.4	8	17	18	13
GRAND TOTALS	549	18,119	3.4	280	254	32	3	3.3	205	291	44	6	3.3	227	261	55	4	3.2	186	284	64	9	3.3	243	226	62	16	3.1	167	253	88	19	2.9	132	228	114	48

Chart Courtesy of Datapro Research Corp.

Weighted average (WA) is based on assigning weights of 4 to each "excellent" (E) response, 3 to each "good" (G) response, 2 to each "fair" (F) response and 1 to each "poor" (P) response.

Bell Asks Custom Calling II Tariff

(Continued from Page 57)

vices through 1981, plus "years of effort and planning," all of which have been "put in question" by the computer inquiry decision — particularly since "our Custom Calling II services cannot readily be redesigned . . . as enhanced offerings."

Two Options

The service consists essentially of two options, which AT&T refers to as "Call Answering" and "Advance Calling." The former allows a subscriber who is away from his phone, or who doesn't wish to receive calls, to have them stored in digitized form within the network on high-density disks.

Later, by dialing specified codes, the subscriber can retrieve these messages. Advance Calling allows the subscriber to store an outbound message within the network and have it delivered at a specified time.

Key features of Custom Calling II are its simplicity, universality and expandability. No special terminal equipment is needed, and stored messages can be received from or delivered to any telephone in the U.S. Thus, Custom Calling II leapfrogs existing electronic message systems, which are too expensive for most homes.

Voice-based teleconferencing is one of many possible extensions of the new service: messages could be input from several different senders, who, after reviewing each other's comments, could input new ones.

Through the Advance Calling option, a store could announce a "private" sale, then use the Call Answering option to collect responses from those who wanted to order or obtain additional information.

A Custom Calling II tariff is pending in Pennsylvania. It has been deferred by the Pennsylvania Public Utilities Commission until January, in response to objections from several telephone answering services. They have also protested to the FCC.

In his recent letter to the commission, Billingsley reported that similar tariffs "should soon be filed in New York, Illinois and Texas. We also have plans to file in Indiana, Wisconsin and Ohio by year-end 1981. Service offerings in the 1981-82 time frame are being planned as well."

STC's Disk Subsystems turn capacity problems into performance opportunities.

When you choose STC high-performance disk subsystems, you get all the increased capacity you need, without the problems you don't need. Many of today's high-performance disk subsystems can provide you with greatly increased capacity. But, if this data cannot be accessed when required by your CPU, overall system performance suffers. STC eliminates these problems by offering disk drives which not only deliver high capacity, they incorporate architectural features designed to provide you with enhanced system performance.

Consider the 8650 high-capacity disk drive where, for even more responsiveness to your configuration and uptime needs, we offer three powerful enhancements. One provides you with a choice of mapping options for greater flexibility in data set placement and subsystem tuning. Another, STC's optional Media Interchange Switch, reduces the period of time data is inaccessible during hardware outages. Then there is STC's Dual Port feature, which substantially increases both performance and data availability.

Or take STC's 8360 High-Performance Disk Drive which combines 18ms access speed with Dual Port to make your subsystem the fastest available today.

Mapping your way to higher performance.

STC's optional volume-interleave mapping places the logical cylinders of primary and secondary volumes into alternating physical cylinders. This approach greatly simplifies migration, tuning and management, since the high activity data sets of each volume will fall on adjacent tracks — minimizing intervolume seek contention.

Thanks to the high-speed servo, seek times will be better than those offered by single density spindles.

Given these attributes, volume-interleaved 8650 spindles are ideally suited for the majority of user DASD storage applications, on-line systems, and low-to-moderate activity data.

STC's back-to-back mapping consolidates the logical volumes in two, separate regions. This approach takes maximum advantage of the dense track spacing and high-speed servo to slash intravolume seek to a mere 18ms, average.

With these characteristics, back-to-back mapped 8650 spindles are best for special applications which can be closely scheduled and managed. For example, use the primary volume for TSO catalogs and TCAM queues with high prime-shift activity, while allocating the secondary volume to batch data sets run second or third shift.

The Media Interchange Switch: Portable fixed media.

Industry-wide statistics show that most problems occur in the drive electronics, not in the HDA. STC's new Media Interchange Switch (MICS) reduces the impact of electronics-related problems by cross-connecting the HDA of spindle A with the electronics of spindle B (or vice versa). This means that if one spindle goes down, you can access your data through the companion spindle's electronics.

Or you can reserve one or more of your secondary logical volumes as a low-cost subsystem spare, and let MICS give you data portability that approaches that of the old disk pack in convenience.

More paths for your data.

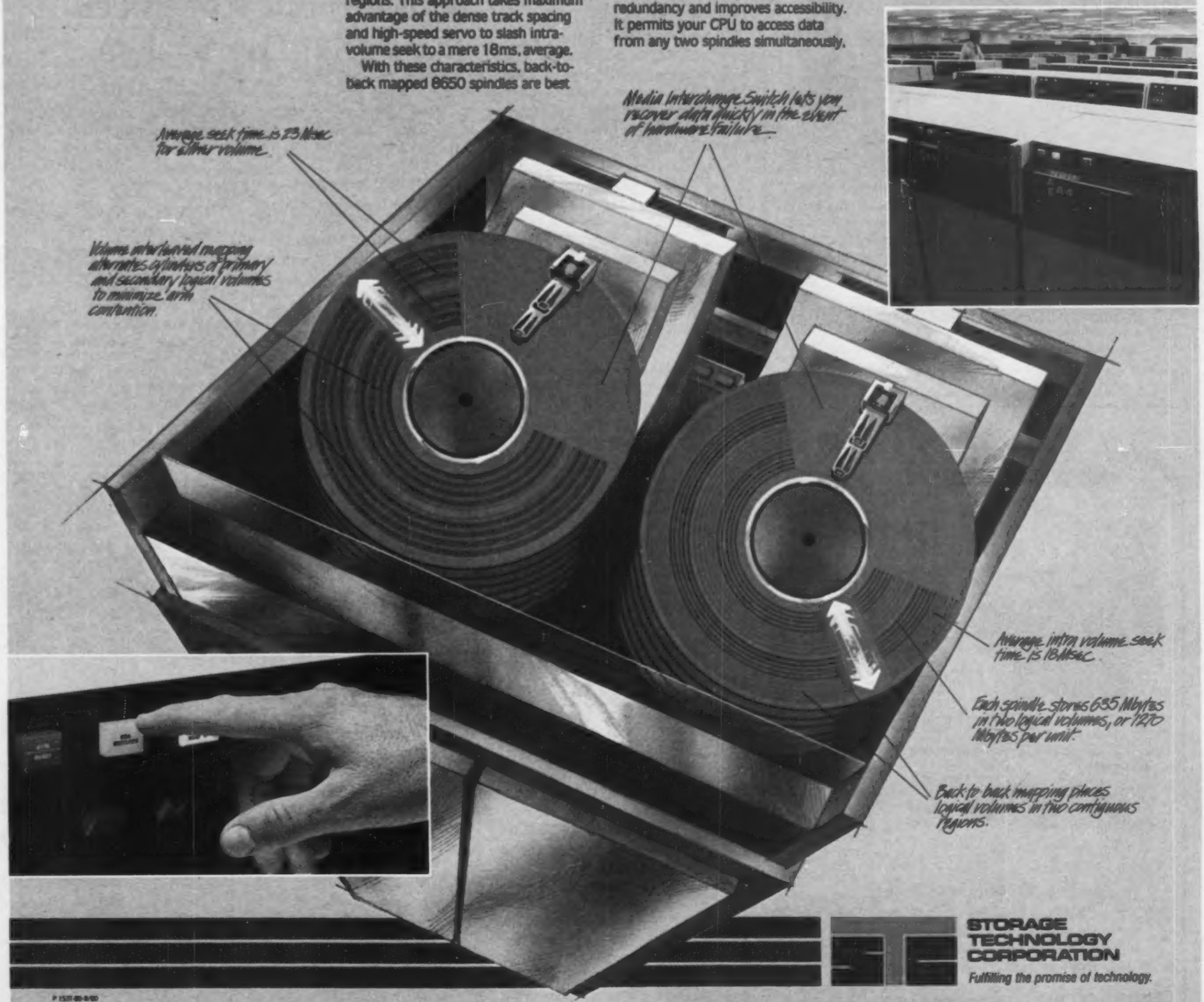
STC's Dual Port option provides path redundancy and improves accessibility. It permits your CPU to access data from any two spindles simultaneously, regardless of their location. This produces a data availability factor of 94% and virtually eliminates disk subsystem single point failures.

Technology. And the skill to apply it.

Backing up your STC disk subsystem performance are the uncompromising STC Systems Engineers. Using software tools, they'll examine your SMF data and assist you in placing data across channels, strings and volumes for maximum results on your job mix. Once your subsystem is up and running, they'll continue to provide ongoing consultation to ensure your long-term satisfaction.

Turn problems into opportunities.

STC's 8650 and 8360 are available for immediate delivery. For more information, including our Mapping and MICS Data Sheets, contact your local STC sales office. Or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville, CO 80027. Phone (303) 673-5151.


Average seek time is 23 Msec for either volume.
Volume interleaved mapping alternates cylinders of primary and secondary logical volumes to minimize arm contention.
Media Interchange Switch lets you recover data quickly in the event of hardware failure.
Average intra volume seek time is 18 Msec.
Each spindle stores 635 Mbytes in two logical volumes, or 1270 Mbytes per unit.
Back to back mapping places logical volumes in two contiguous regions.

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Interactive Communications

TI DS990 Gets Remote Controller

HOUSTON – A remote terminal controller (RTC) for use with Texas Instruments, Inc.'s DS990 models 4 through 30 has been announced by the firm.

The RTC reportedly provides the DS990 general-purpose computers with interactive remote communications via leased or switched common carrier lines.

Designed to provide a cost-effective solution for installations that require remote terminals multidropped off the same communication line, the RTC can support multiple Model 911 CRT terminals, Model 810 printers, Model 810 KSR terminals and Model 743 KSR terminals.

The RTC is based on a TI 990/5 microcomputer with 64K bytes of memory and includes a Model 911 CRT terminal. It supports rates up to 9,600 bit/sec.

The controller uses the binary synchronous communications protocol provided by the remote terminal subsystem (RTS) communications software, which must be purchased separately.

The tabletop RTC costs $10,600 with a TI synchronous internal modem and $8,600 with a Bell data set interface. The pedestal version of the RTC is $12,450 with a TI synchronous modem and $10,400 with a Bell data set interface. The RTS communications software license is available for $1,100 and includes one year of software updates and support.

TI's Digital Systems Group can be reached through P.O. Box 1444, M/S 7784, Houston, Texas 77001.

Modem Acts As Bell 103A

BOULDER, Colo. – A 300 bit/sec Bell 103A-compatible modem is being offered by Komda Corp. as a replacement for the acoustic coupler. The Model HS2500 modem was designed for multiline use.

Komda is the sole licensee under a pending patent application covering the concept of a plug-in handset modem for use with modular telephones, the vendor claimed.

An automatic signal level compensating circuit, in conjunction with a high-quality active filter circuit, permits operation under varying and marginal conditions, including long-distance connections, a spokesman said.

The price for the product is $285, the vendor said from 2500 Central Ave., Boulder, Colo. 80301.

Rixon Adds Data Set

SILVER SPRING, Md. – An originate-only 0- to 300-bit/-sec full-duplex acoustic coupled modem designed to transfer data over normal voice-grade lines using the most commonly available telephone sets is being offered by Rixon, Inc.

The ACM300 requires a receiving unit capable of operating in the answer mode, such as a Rixon T103A, T103J, T113B, T113D, T212A or equivalent. Both voltage – EIA-RS-232C – and current – 20 mA – interfaces are provided in each modem.

The unit provides positive mechanical locking of the handset, noise isolation and a vibration technique using direct microphone-handset coupling, the vendor said, and costs $295 from Rixon at 2120 Industrial Parkway, Silver Springs, Md. 20904.

The Model 607

Aydin Set Tests Transmission Systems

FORT WASHINGTON, Pa. – Aydin Monitor Systems has unveiled its Model 607 data transmission test set, designed to test, evaluate and maintain data transmission equipment and systems operating in the range of 10 bit/sec to 100M bit/sec.

The unit measures bit error rate, block errors, second errors, block and second throughput and presents the measurement results on a formatted 5-in. CRT display, the vendor said.

Control of the unit can be accomplished from the front panel or via the IEEE 488 bus. A printer may also be connected to the bus to provide hard copy of test results and unit setup parameters.

The price of the unit is $14,500, the vendor said from 502 Office Center Drive, Fort Washington, Pa. 19034.

Monitor Bus Controller Joins Digi-Log System

HORSHAM, Pa. – Digi-Log Systems, Inc. has added the MBC-1200 monitor bus controller to its Network Supervisory System.

The MBC-1200 facilitates local or remote – up to 300 feet – diagnostic monitoring of any line within a data communications network without physically changing any connections and without interrupting normal network operation, the vendor claimed.

The product addresses and selects for monitoring any of up to 256 lines or channels via a thumbwheel dial and select button on its front panel. The selected line or channel is connected to a monitor bus that electronically isolates the line to eliminate failures that may result from loading by the diagnostic equipment, a spokesman said.

The AM/20 Alarm Module is also available. It plugs into the network supervisory system and produces a continuous audible and visual alert to abnormal conditions that occur within a data communications system, he added.

The monitor bus controller costs $675 and the alarm module, $240, the vendor said from Babylon Road, Horsham, Pa. 19044.

DISC PACK FILING

Wright Line's Optimedia® Cabinets provide a safe, convenient, cost effective method of filing all sizes and types of disks. Full suspension roll-out shelves simplify the handling of heavy packs. Custom configurations allow magnetic tape or other media to intermix with disks in the same cabinet. For further information, circle the readers' service number or write: Wright Line, Inc., 160 Gold Star Boulevard, Worcester, Massachusetts 01606.

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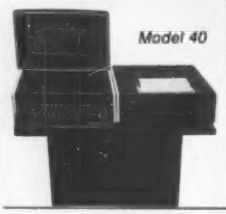

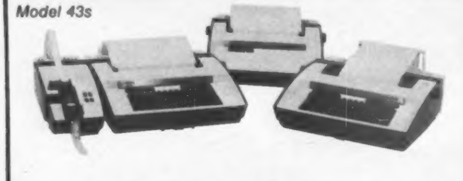

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IBM-compatible computers explained–by the leader in IBM-compatible computers.

In these times of recession, inflation, and high interest rates, it's important to get the most for your money when expanding your computer installation. Especially when you're under pressure to increase productivity within your current budget limitations.

At National Advanced Systems, we offer the industry's broadest range of inflation-fighting IBM-compatible computers. In fact, we have the largest installed base in the entire industry. That's why it makes sense to consider a compatible computer from the leader in the field.

The IBM-compatible industry is here to stay.

To understand the compatible computer industry requires an appreciation of the commitment users have made to software designed to run on IBM mainframes. When you realize that over $300 billion worldwide has been spent on IBM software and training, it's obvious that a hardware revolution resulting in the incompatibility of existing software will never happen.

This fact has allowed manufacturers such as ourselves to provide superior price/performance alternatives to IBM users. As a result, the IBM-compatible segment is now growing twice as fast as the rest of the data processing industry. In fact, last year was a record growth year for the compatible industry, outpacing even IBM.

Compatible computers are here to stay. And National Advanced Systems will remain in the forefront – because we understand your need to increase productivity while protecting your investment.

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Our Advanced Systems product family is backed by a $1 billion multinational corporation, offers unequaled price/performance, and boasts higher residual values over time than even IBM. Our family ranges in size from our medium-scale AS/3000 to our AS/7000 DPC which outperforms the IBM 3033. And each system is backed by the finest service and support in the industry.

For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. A1, 3145 Porter Drive, Palo Alto, CA 94304, 415/856-5000.

National Advanced Systems. In economic times like these, it's nice to know there's a company compatible with today's budget realities.

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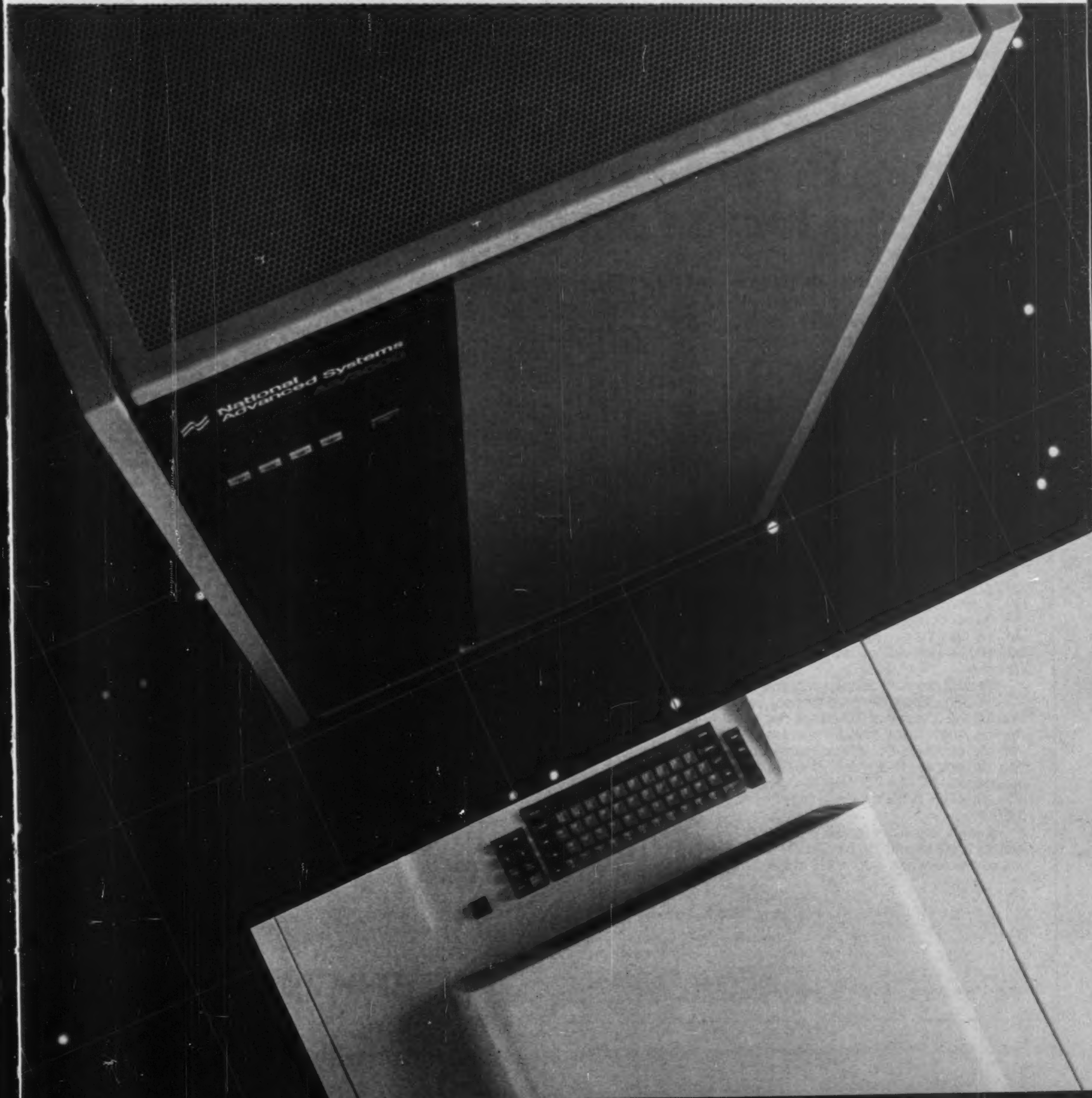

32-bit power. $36,000. 60-day delivery.

The Megamini® Model 3220 from Perkin-Elmer is the supermini for the power-hungry.

You want all the minicomputer power your dollar can buy. The Perkin-Elmer Model 3220 is the 32-bit price/performance leader.

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You want throughput power. With the 3220, you can attach more than 1,000 devices on its multiplexor bus with a throughput of 400K bytes per second. An extended direct memory access bus includes seven ports, each of which can serve 16 controllers, providing high-speed direct memory access with a throughput of 8 million bytes per second.

You want operating system power. Up to 255 user tasks can be executed concurrently at user-defined levels of task priority.

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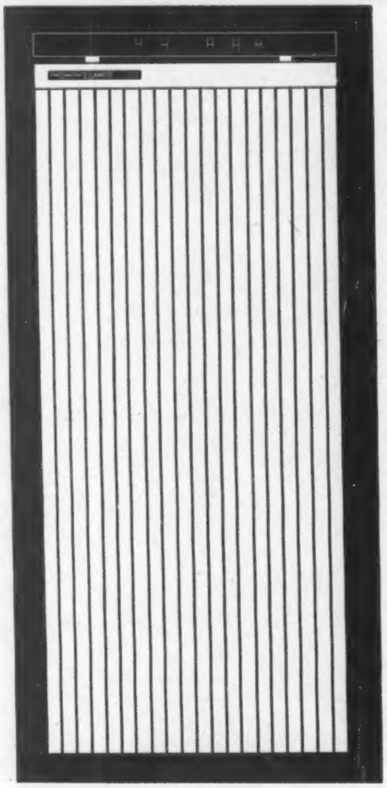

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Bits & Pieces

HP Combines Drives In 240M-Byte System

PALO ALTO, Calif. — Hewlett-Packard Co. has combined two HP 7925S add-on disk drives to form a 240M-byte disk system.

The HP 7925T can increase storage on HP 1000 and 3000 systems by 12%. The combined add-on drives list at $29,950, $4,050 cheaper than the cost of the two drives separately, the vendor said.

The combined drives, called the HP 7925T, have an average random seek time of 25 msec and a track-to-track seek time of 5 msec, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Impact Printer Offers 'Quick Cancel' Feature

SALT LAKE CITY, Utah — Micro Peripherals, Inc. has unveiled its general-purpose Model 88G impact matrix printer.

The printer features 100 char./sec bidirectional or unidirectional printing with a short-line "quick cancel" feature, giving throughput rates of up to 150 line/min, the vendor claimed.

The product costs $799 with a high-resolution dot-addressable graphics option and $749 without, from 2099 W. 2200 S., Salt Lake City, Utah 84119.

DMA Transfer Board Runs Four Disk Drives

CHAMPAIGN, Ill. — A cartridge disk controller board said to allow DMA transfers to or from as many as four standard cartridge disk drives with capacities of 2.5M to 20M bytes is available from Central Data Corp.

The board contains a CRC generator that detects any errors and allows overlapped seeks on up to four drives, reportedly increasing throughput on large systems.

The board, Part No. B-1016, costs $575 from 713 Edgebrook Drive, Champaign, Ill. 61820.

Diesel Generator Sets Back Up Large Users

MIDDLETOWN, N.Y. — A line of diesel electric generator sets designed to supply standby power for large computer installations is available from KW Control Systems, Inc.

Available in ratings from 125- to 1,000 kW, the Piller Diesel Electric Generators are designed expressly for installations that experience long-term power interruptions as well as being usable as power backup for an overall energy management system, according to the firm.

Prices for the sets range from $22,800 to $138,000, a spokesman said from R.D. No. 4, Box 114C, S. Plank Road, Middletown, N.Y. 10940.

Daisy-Wheel Unit Uses Text Output Processor

TUCSON, Ariz. — A hardware/software combination implementing a text output processor for use with daisy-wheel printers has been introduced by Scroll Systems, Inc.

The Retroscroller works with any host computer and any host text editor, the firm stated. Text can be proportionally spaced, words can be underlined, boldfaced or printed in various combinations. Mnemonic control sequences can be entered into print text using any editor on any computer supporting RS-232 serial communication links according to the firm.

The Retroscroller costs $750 from Scroll Systems at 6930 E. Acoma Place, Tucson, Ariz. 85715.

Versatec Plotter Updates Include Backplates

SANTA CLARA, Calif. — Versatec, Inc. is offering enhancements to its Series II electrostatic plotters that include electrically biased backplates, hybrid nib drivers and a centralized cooling system.

The backplate reduces toner signature during mid-plot pauses, improving stop-start and remote output quality. The hybrid nib drivers replace discrete components for less heat and greater reliability and the centralized cooling system reduces operating temperature for longer component life, the vendor claimed.

Versatec Series II plotters are priced from $20,000, the vendor said from 805 Bowers Ave., Santa Clara, Calif. 95051.

User's 8100-Based DDP Means Reorganization, New Business Methods

By Connie Winkler
CW Staff

NEW YORK — In moving to a large, IBM 8100-based distributed data processing (DDP) operation, Royal Insurance started two new departments — and changed the way the company does business.

The departments, one to review subsequent DDP architecture and one to troubleshoot hardware and software operations problems, are just two of the changes Royal made as a result of a massive effort to distribute DP capability to its offices around the country and yet maintain central control, Robert F. Dadd told a session on DDP sponsored by the Association for Women in Computing (AWC) here recently.

The effort, a cooperative one with IBM, is Field Office Network Development (Fond). Envisioned in 1973, development began in 1975 and is expected to continue through the mid-1980s, said Dadd, director of DP for systems and programming.

Fond was initially eight IBM 3790 controllers, but those were replaced after IBM announced the 8100 in October 1978.

Today there are 14 Royal locations serviced by 8100s including 10 processing centers at either large branches or regional offices and four downstream operations that are supported by those 8100s. The 8100s will be replaced by the coming 8100Bs, Dadd said.

The main regional 8100s with 387K bytes of memory run 12 to 14 terminals and one printer, while there are six terminals and a printer at the downstream offices. Royal trained employees at the regional offices to operate the 8100s, Dadd said.

SDLC Employed

The 14 8100 locations communicate with the company's headquarters here via leased lines employing IBM's Synchronous Data Link Control (SDLC), a feature of Systems Network Architecture (SNA).

The host processors are an IBM 3033 with 6M bytes of memory and as backup, the 370 Model 168 AP running 8M bytes and MVS/OS. Royal in New York has 128M bytes of disk storage.

"Our contacts when we were looking at the 3790 showed we were looking at the beginning of a long line of DDP equipment," Dadd said. "We didn't want to get locked into a particular technology.

"It was a business decision that got us looking at distributed processing," Dadd recalled. Since the 1960s Royal had been running a centralized operation with IBM 3270 dumb terminals.

(Continued on Page 66)

Crepe Soles and Polyester Computer's Worst Enemies?

By Tim Scannell
CW Staff

ORLANDO, Fla. — Synthetic fiber sweaters and crepe shoe soles may be a computer's worst enemies. A person wearing them in a dry room can generate enough static electricity to destroy a computer's printed circuit boards or MOS memory devices.

In fact, insulated shoe soles, synthetic fiber clothing or carpets and even plastic envelopes and bags are probably the single biggest cause of both soft and hard data errors in most computer installations, according to Jim Palmer, a researcher at Univac's Roseville, Minn., facility.

Not only can static electricity not be prevented totally, but it is a universal problem that is growing worse as the computer technology becomes more compact and sophisticated, Palmer observed.

Speaking at a recent gathering of Univac 1100 series computer users here, Palmer began by giving a brief "high school rundown" on the physics of atoms and electrons and then plunged into a description of the hidden static electricity dangers lurking within even the most sterile computer room.

Simple Phenomenon

First of all, he explained, static electricity is caused either by rubbing two insulators together, which would happen if an operator with crepe soles shuffled across a synthetic fiber carpet, or by pulling two insulated surfaces apart. The latter case might simply involve lifting a magnetic tape reel from a plastic-topped surface.

The physics of static electricity are simple. For instance, when a crepe-soled operator shuffles along the rug he is picking up negative charges, Palmer said. When he reaches the processor, which is usually positively charged, electrons will jump from the machine to his body to equalize the positive and negative charges. Generally, a spark will be seen and felt by the operator during this equalization process.

What can't be seen, however, is the internal damage that could be done to the processor. The operator in the above case can potentially generate a charge of up to 40V. Most MOS transistors and memory devices contain wafer-thin parts, particularly glass, that can be destroyed by as little as 30V, Palmer noted. And the effects of static electricity are even worse if the processor's cabinet door is ajar at the time of the electrical mishap.

Adding to the dilemma, Palmer explained that static electricity can destroy printer circuit boards or other internal devices at the manufacturing stage, resulting in new but faulty computer equipment.

Recent Recognition

Although static electricity is a very real problem, especially for newer machines that have shorter data pathways and therefore a shorter distance for the charges to travel, vendors have only recently acknowledged its effects. In fact, Univac didn't start to tackle the problem se-

(Continued on Page 66)

Unit Captures Handwriting

CHICAGO – A peripheral that captures handwritten data at the time of writing as well as alpha, numeric and special characters and translates it directly into machine-readable form has been introduced by Micropad, Inc. The unit incorporates both RS-232C/V.24 and 20-mA current-loop interfaces and can be connected to any kind of computer, the firm said.

Micropad consists of a writing station with an integral 40-char. line display, expandable by optional connection to a full CRT terminal. Character recognition takes place within Micropad; all that is transmitted to the computer is the Ascii character plus its position, the vendor explained.

Micropad costs $2,950 from the vendor at Suite 1510, 35 E. Wacker Drive, Chicago, Ill. 60601.

Extinguisher Geared To DP Room Fires

SANTA CLARA, Calif. – A fire extinguisher designed to fight computer room fires without damaging hardware or data is available from Inmac Corp.

The Data Rescue uses Halon 1211, a chemical agent more effective than CO^2 in fighting fires but safe for electronic equipment, the vendor claimed.

The extinguisher comes in three portable models ranging in price from $62 to $230, the vendor said from Department 1026, 2465 Augustine Drive, Santa Clara, Calif. 95051.

DDP Changes Business Methods

(Continued from Page 65)

However, the intensity of the paperwork involved in the fire and casualty insurance business, the geographic spread of the company and the complexity of the applications – some requiring 100 clerical tasks – prompted Royal to look seriously at DDP.

Further the average record size is 3,000 to 5,000 characters and the insurance business imposes a high level of maintenance because of outside regulations and requires a high level of systems availability. The assembly line at Royal is putting together pieces of data to provide processing information, Dadd said by analogy to manufacturing operations.

Task Force

A Royal task force of users, beginning in 1973, studied the needs of the company's next system for 18 months. Once the system characteristics were defined, systems designers went to work and came up with Fond, which is a combination batch processing system running under IMS, and the on-line DDP system, Dadd said.

"Royal was adamant about maintaining centralized control of programming and software," Dadd said. What it came up with is a flexible but huge system of 1.5 million lines of production code and "it's still growing."

Incorporating DDP into the system added complexity because designers had to answer the question where the data would reside and which of the 275 system functions should be distributed, the DP manager said.

'In answering those questions tradeoffs had to be made. We needed to develop something we never had before, a cohesive architecture," Dadd said. Thus the architecture design department that endures today.

For those decisions to centralize or distribute function, Royal maintained thorough documentation. That has proved beneficial since decisions can be reevaluated later, Dadd said.'

And there have been some major changes to the system, Dadd noted. Initially the rating of policies, which required complex arithmetic calculations, was done centrally. With the increased memory of the 8100, however, that function has been distributed.

There were also numerous data base considerations, although Royal basically wanted the data base centralized, and the remote locations now have subsidiary data bases.

Royal had to develop its own control software for its remote operations, Remote Operations Control Software (Rocs), in a joint effort with IBM. IBM has since released its over version, Display Management System.

Would Royal go through this again? "Not an easy question to answer," Dadd said. "A large part of what we have done was analyzing the business. The analyses we did we would have done anyway, and we think we would utilize the same hardware answer."

Crepe Soles May Be Enemy

(Continued from Page 65)

riously until about three years ago when it began having problems with its own machines, Palmer stated.

This ignorance is why most standard DP articles such as plastic magnetic tape sleeves, disk pack covers and plastic and Styrofoam packaging material are tremendous insulators and therefore capable of carrying charges of sometimes up to 100 kV, Palmer continued. The research on static electricity could be compared to a quart bottle "where we don't even have the first ounce yet," he added.

While static electricty can not be totally eliminated, the voltage of the charges can be reduced to negligible amounts. Users can protect a system against static electricity damage by keeping the computer room's humidity at vendor-recommended levels, banning all unnecessary plastic, and using air ionization devices that stabilize the balance between an area's negative and positive electrons. Conductive wheels should be used on any type of cart or dolly and maintenance personnel should not use any kind of waxes or aerosol sprays within the computer room, Palmer said.

In extreme cases, a user can install grounded false floor grids or conductive tiles, he added.

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System/3 Comes in Next

Microdata Takes Top Slot in User Survey

By Bruce Hoard
CW Staff

CHERRY HILL, N.J. – Microdata Corp.'s small business computers and peripherals came out on top in Management Information Corp.'s MIC fifth annual Small Business Computer Users Survey.

The survey, conducted to determine how well computer products are meeting users' needs, drew more than 600 responses from companies using 900 small business computer systems and 1,446 peripheral devices.

Each respondent was asked to evaluate his equipment basd on performance, reliability, ease of use, maintenance and manufacturer support. The survey's rating code awarded a 4 for excellent, 3 for good, 2 for fair and 1 for poor.

In the small business computer area, 41 respondents representing a total of 84 Microdata Reality systems rated them high in performance, reliability and ease of use with scores of 3.8, 3.8 and 3.9 respectively. Ratings for service and support were somewhat lower at 3.4 and 3.2, however, giving Reality an overall tally of 18.1.

Breathing down the leader's neck with a 3.6, 3.8, 3.6, 3.7 and 3.3 – a total of 18 – was the IBM System/3 Model 15. This sample was drawn from nine respondents, representing nine units, significantly fewer than the sample for Reality.

The IBM System/3 models 6 and 10 and the System/32 were the only other small business computers to average better than 3.

As for Peripherals . . .

With respect to peripherals, Microdata was first in disk drives, beating out Wang Laboratories, Inc. 18.9 to 18.3. The leader scored high throughout and was rated 4 in ease of use. Wang racked up 4s in performance and reliability.

The Microdata CRT beat the Qantel Corp. product, its only competitor, receiving 4s in three of five categories: performance, reliability and ease of use. Combined with a 3.7 in service and 3.8 in support, it scored a near-perfect 19.5. Qantel accumulated a respectable 18.5, falling down only in support, where it garnered a 3.

It was more of the same in tape drives, with

(Continued on Page 68)

A Look at the Sites

CHERRY HILL, N.J. – Besides rating small business computers, peripherals and software, Management Information Corp.'s (MIC) Small Business Computer Users Survey also unearthed other germane information about the small business computer market.

In profiling its respondents, the survey learned that 25.5% of them had between $1 million and $5 million in annual sales, while 21.3% took in from $500,000 to $1 million. Seventeen percent took in between $5 million and $10 million; 10.6%, between $10 million and $20 million; and 10.6%, more than $20 million. Firms with less than $500,000 in sales also represented 10.6% of the total sample.

Twenty-eight percent of the respondents were associated with services; 22%, manufacturing; 14%, wholesaling; 8%, retailing; 5%, finance; and 2%, transportation. Twenty-two percent were listed as being associated with other industries including computer sales, installation and support; industrial distribution; education; association gasoline dealers; and consulting.

(Continued on Page 68)

Multifunction Family Boasts Desktop to 16-Station Setups

SANTA CLARA, Calif. – A multifunction-workstation-based line of computers that range from a desktop unit to a 16-station system with 58M bytes of Winchester and floppy disk storage has been unveiled by Convergent Technologies.

CT Integrated Workstation

The CT family, consisting of six standard versions, is the year-old firm's first product offering and was reportedly designed to distribute processing power and data storage capacities into clusters of multifunction workstations and storage modules. The systems are geared for single-board computer users upgrading from dedicated to user-programmable applications and large end users requiring single- and clustered-distributed processing systems.

The CT-1111-1, the flagship machine, is a desktop computer with 128K bytes of memory expandable to 1M byte and 1M bytes of dual-floppy storage. Features include a fully programmable CRT display that is said to permit a variety of screen formats and an Ascii character set along with bit-map graphics, commonly used symbols and some foreign characters. Additional character sets are random-access-memory loadable, a spokesman explained.

The system can handle five programming languages, including Assembly, Basic, Pascal, Cobol and Fortran. The unit's CTOS operating system is a multitasking design

(Continued on Page 72)

C Language Turnkey Doubles As Station or Network Node

CAMBRIDGE, Mass. – A microprogrammable turnkey software development system that operates in the C language and doubles as a computer network node or distributed station has been introduced by BBN Computer Corp.

The C/70 system uses C language functions and microroutines rather than assembler code and was reportedly designed to execute that language up to three times faster than other systems in its price range.

The unit features 20-bit addressing and has 16 times the single-program space of traditional minicomputer processors. It also has a real-time memory-only operating system for nondisk environments that can be used for data communications or real-time process control applications that do not require time-sharing, swapping or disk access, a spokesman said.

C/70 processor components include an 8K- by 32-bit micromemory, a 1K- by 12-bit dispatch memory, an arithmetic-logic unit, as well as a source and a destination bus. The computer also contains an instruction mapper and a memory management unit, the spokesman said.

(Continued on Page 72)

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MIC Survey Profiles Small Systems Operations

(Continued from Page 67)

The respondent companies reflected a fairly even mix in terms of numbers of employees, ranging from 15% with less than 10 to 10.6% with more than 500.

Popular Applications

Accounts receivable was revealed as the most popular application among the users; it was used by 70.2% of the respondents. Following it were billing at 59.5%; payroll, 57.4%; accounts payable, 57.4%; general ledger, 57.4%; sales analysis, 53.2%; inventory, 46.8%; management information, 40.4%; and cost analysis, 29.8%.

Among its other findings, the survey discovered that ease of use and training topped the list of most important criteria in choosing a system. Eleven respondents chose ease of use and training as most important, eight said it was second most important and five ranked it third.

Thirteen tabbed reliability as the number one criterion, five said it was number two and five number three, to place that category close behind the leader.

Although only three people listed service as their number one criterion, it received enough number two and three votes to edge out the next finisher, software availability, for third place.

The others, in order of finish, were cost, expandability, manufacturer's reputation, processing capability, ease of programming and peripherals.

Asked which three computer manufacturers they would consider first if switching vendors, users most often mentioned Microdata Corp., Digital Equipment Corp. and Data General Corp. But 69.6% expressed content with their present systems and 26.6% felt their systems contained more capabilities than they could use.

Problem Areas

Among problem areas, interfacing with other systems and manufacturer support tied with 20.4% of the responses each.

Following those problems were program languages, flexibility, data capacity, reliability, costs and equipment design.

"Other" received 4.8% of the responses, putting it just ahead of equipment design. "Other" areas included application software availability (including across vendor lines), price competition in software and programming to meet users' needs.

Wish List

The "features, capabilities or characteristics" the users said they would most like to see on the next generation of small computer systems include:

- Communications between other computers.
- Faster processing speeds.
- Less expensive core and disk; hard disk storage.
- Simpler programming languages.
- Multitasking.
- Data base management.
- Better services.

"Judging from this listing and others we read on the surveys, it seems that small business computer users want those qualities taken for granted in larger computer systems to be implemented on smaller models," the survey concluded.

Microdata Tops In User Ratings

(Continued from Page 67)

Microdata topping out at 19.5 again. This time it registered perfect scores in performance, reliability and support. The Hewlett-Packard Co. magnetic tape drive was the only competition, checking in with scores ranging between 3.3 and 3.5.

Printronix, Inc. was the only firm to loosen Microdata's stranglehold on the peripheral market, bulling its way into a first-place standing in printers. The company accumulated a total of 18 based on 3.6, 3.8, 3.4 and 3.4 scores. Microdata was second at 17.7.

Overall in peripherals, Microdata averaged a total of 18.8, with an individual high average of 3.9 for ease of use.

In software, Microdata was outranked by Mini-Computer Systems, Inc., which rated a 19.3 total, compared with Microdata's 18.6 and Systems Management, Inc.'s 17.1. Those three vendors were the only ones that averaged ratings higher than 3. However, as the survey indicated, the "Microdata software" was not written by that hardware-oriented company, but software houses that distribute its computer products.

The survey is available for $15 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

TRS-80 Mod II Users Set Up Association

AUSTIN, Texas — To promote use of Tandy Corp. TRS-80 Mod II computer for processing problems and recordkeeping for small businesses, the National Association of the TRS-Two Users has been formed.

Vernon and Gina Smith of Computersmiths, Inc., along with Don Bennett of Bennett's Business Services, Inc., formed the group, which is headquartered here.

Membership dues are $30 per year. More information can be obtained from association headquarters, which may be reached through P.O. Box 14091, Austin, Texas 78761.

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No Thank You, IBM.

LSI-11 Gains Configurations

MARLBORO, Mass. – Digital Equipment Corp. has added five configurations to its LSI-11 line of microcomputers. Four of the configurations were added to the LSI-11/23 family and one was added to the LSI-11/23 family.

The LSI-11/23 addition is an entry-level component package that consists of a central processor, 32K bytes of random-access memory (RAM), two serial lines, a clock and provisions for 8K bytes of read-only memory (ROM) or erasable programmable read-only memory (Eprom).

A package is also available that includes an LSI-11/2, 64K bytes of RAM, four serial lines, a clock, ROM/Eprom provisions and a software license for DEC's RTT runtime package, the vendor said.

The LSI-11/23 configurations offer 160K-K, 192K-, 224K- or 256K-byte memory units and enable users to establish logical growth patterns for their systems, DEC said.

The LSI-11 processors range in price from $3,000 to $5,900, and the LSI-11/2 models cost between $1,050 and $2,290, the vendor said.

Unibus Interface Emulates TM-11

JESSUP, Md. – Digi-Data Corp. is offering the Unibus Compatible Interface (UCI), designed to connect Digi-Data Series 40 formatted magnetic tape transports to Digital Equipment Corp. PDP-11 Unibus minicomputers.

Because the product emulates the DEC TM-11, it is compatible with standard DEC software. It offers the advantage of dual-density NRZI/-phase-encoded operation – without software modification, the vendor claimed.

Extent of Support

The board also supports 9-track 800 bit/in. NRZI, 9-track 1,600 bit/in. phase-encoded and dual-density 800/1,600 bit/in. operation. Tape speeds from 12.5- to 75 in./sec can be utilized.

The interface is compatible with any Digi-Data Series 40 tape transport with imbedded microprocessor controlled formatter. Multiple transport systems of up to three slave transports daisy-chained to a formatted master transport can be configured, a spokesman said.

The price for the board is $1,500, the vendor said from 8580 Dorsey Run Road, Jessup, Md. 20794.

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Tape Controllers Offered For PDP-11, LSI-11s

CRANBURY, N.J. – Dataram Corp. has announced the T04 and T34, a family of dual-density tape controllers for Digital Equipment Corp.'s PDP-11 minicomputers and LSI-11 microcomputers.

Dataram's T04 is compatible with the LSI-11 and the T34 is compatible with the PDP-11, the firm said.

The T04 and T34 use a packaged approach. For example, for an NRZI mode, one quad board is required. For the phase-encoded mode, a dual-size phase-encoded mode is added, the vendor said.

The phase-encoded board draws 5V and ground from the backpanel of the host minicomputer, but does not use any of the bus signals on the backpanel. This allows the board to be inserted in any available minicomputer slot, Dataram said.

Dataram's tape controllers, compatible with DEC's TM11 and TU10, operate with industry standard tape drives and support 7- or 9-track, NRZI or dual-density drives, the vendor said.

Up to four drives can be daisy-chained to one controller, and 64 bytes of data buffering is provided.

The T04 and T34 cost $2,600 each. The dual-density versions cost $3,300, Dataram said from Princeton-Hightstown Road, Cranbury, N.J. 08512.

Disk Targets DEC Users

SANTA CLARA, Calif. – Data Systems Design, Inc. has added an 8.8M-byte-capacity disk system to its line of Digital Equipment Corp.-compatible disk memory systems.

The DSD 880 is said to combine an 8-in. Winchester disk and an 8-in. floppy disk in a 5.25-in. rack-mountable unit. Both LSI-11 and PDP-11 interfaces are offered with the product.

The DSD 880 reportedly is an alternative to users of both the DEC RX02 floppy system and the DEC RL01 cartridge disk system.

The DSD 880 costs $7,495, with quantity discounts available from the firm at 3130 Coronado Drive, Santa Clara, Calif. 95051.

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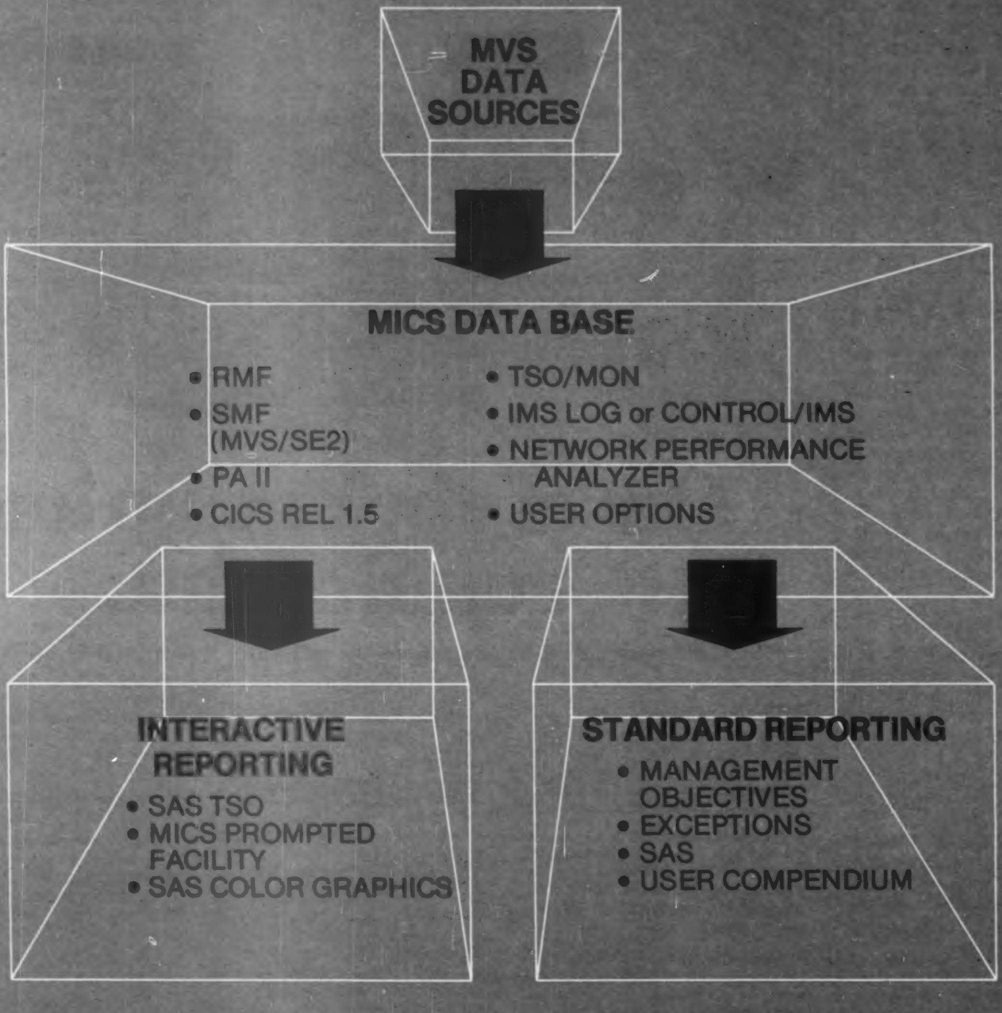

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The SBC-1 Shoebox

Portable 16-Bit CPU Bows

HAUPPAUGE, N.Y. – The SBC-1 Shoebox, which marks North Atlantic Industries, Inc.'s expansion from peripherals to complete computer systems, may be the industry's smallest self-contained 16-bit digital computer, according to the vendor.

The 5-1/2-in. by 8-in. by 11.75-in. enclosure contains power supplies, front-panel operational controls, cooling fans and Q-bus backplane fully wired for dual-height 5.5-in. by 8.5-in. logic cards. It includes a Digital Equipment Corp. LSI-11/2 processor, two RS-232C interfaces, 8K bytes of random-access memory (optionally expandable to 32K bytes), a 60Hz crystal clock and space for 8K bytes of read-only memory.

The enclosure includes two vacant card slots that accept additional logic cards if needed to configure the computer for different applications. The unit may be moved from job to job.

The SBC-1 can be hardwired to associated equipment or can be supplied with an acoustic coupler for data transmission over telephone lines. It can be used in distributed intelligence applications, in conjunction with a host computer to relieve some of the processing load or to record data in the field.

The SBC-1 costs $2,560 from North Atlantic's ACS Division at 60 Plant Ave., Hauppauge, N.Y. 11787.

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Family Boasts Six Models

(Continued from Page 67)

that utilizes a building-block approach to software development. The operating system includes process management and message facilities, system service processes, system common procedures, object module procedures, device handlers and interrupt routines, the spokesman noted.

Dual-Bus Architecture

The computer also boasts a dual-bus architecture, called CT-Bus, that provides Multibus-compatible card slots for systems designers. Optional features include a high-speed Intel Corp. 8087 mathematics processor for large engineering, scientific and business applications, the spokesman pointed out.

Other members of the CT group that have those features are: the CT-1121-1, a single workstation with a 10M-byte, 8-in. Winchester drive and one floppy disk; the CT-1111-2, a two-station cluster with 1M byte of floppy disk storage; the CT-1121-4, a four-station system with the 10M-byte Winchester and floppy drives; the CT-2123-8, and eight-station setup featuring a shared resource processor (SRP), 30M bytes of Winchester storage and 500K byte of floppy storage; and, finally, the CT-2132-16, a 16-station computer system with SRP, 58M bytes of 14-in. Winchester storage and one floppy disk.

A streaming cartridge tape drive can also be fitted to the last system for off-line data backup, the spokesman explained.

The units cost from $11,990 for a single-station setup to $133,500 for the full-blown clustered version. The CT-1111-1 and -1121-1 are available now; the models CT-1111-2 and -1121-4 will be available toward the end of this year; and the CT-2123-8 and CT-2132-16 will be unwrapped in the first and second quarters 1981, respectively.

All of the smaller versions can be upgraded to a more powerful version and the software is said to be completely portable.

Additional information on the systems can be obtained from the firm at 2500 Augustine Drive, Santa Clara, Calif. 95051.

Turnkey Runs In C Language

(Continued from Page 67)

In addition, the C/70 implements many I/O functions in microcode and is said to incorporate a disk controller that makes 89% of disk space available to the user, rather than the typical 80%.

Unix Provided

The C/70 is provided with a fully supported, tailored version of Western Electric Co.'s Unix operating system written in C that includes a network capability to support Arpanet protocols, the spokesman added.

A typical C/70 system with 256K words of memory, 32 asynchronous lines, a storage module disk controller and cabinet costs $47,500 with OEM discounts available.

BBN is at 33 Moulton St., Cambridge, Mass. 02238.

Portable Unit Reads Bar Codes

LYNNWOOD, Wash. – Interface Mechanisms, Inc. has unveiled a portable bar code reader designed for inhouse data collection by mini users.

The Model 9400 has a capacity of 20,000 alphanumeric characters and is organized into variable-length records up to 63 characters long.

The price for the basic unit is $1,695. The optional Model 9401 charger/-interface unit costs $340 and a real-time clock is available for $150. The vendor can be reached at P.O. Box N, Lynnwood, Wash. 98036.

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Say Software Not Delivered

Three Sue Honeywell Over Level 6 Mini

By Connie Winkler
CW Staff

NEW YORK — At least three systems houses are suing Honeywell, Inc. for failing to deliver promised system software for the Level 6 minicomputer. One of the companies nearly went bankrupt, and another said its business was set back two to three years.

"Everybody and God is getting ready to sue Honeywell," a former Honeywell executive said of the Level 6 situation. *Computerworld* has uncovered three lawsuits, filed by Accusystems, Inc. of New York City, Basic Computer Systems, Inc. of Long Beach, Calif., and Computer Accounting, Inc. of Tacoma, Wash.

The Level 6 is a small system that the company announced in 1977 and began marketing on an OEM basis to small systems houses. Those involved in the lawsuits claim the software, particularly the TL-6 transaction language and a Basic compiler, never worked.

A Honeywell spokesman in Waltham, Mass., said he could not comment on the Level 6 situation because two of the suits are in litigation and the company has yet to receive the third.

One of the companies charged Honeywell with poor management for acquiring a minicomputer manufacturer, forming a separate marketing division within Honeywell known as Minicomputer Marketing Organization (MMO) and putting MMO under the direction of Honeywell's Manufacturing Division.

There was never enough software support for Level 6, and the operating systems were developed outside the standard software development channels, the former Honeywell executive said.

When Honeywell saw the Level 6 was in trouble, the software — an orphan already — was turned over to Honeywell's regular Data Products Operation, which had no interest in the project, he added.

Computer Accounting

Computer Accounting is a service bureau that specializes in handling travel agencies. When it decided to package a system for travel agencies based on Honeywell's Mutual Airline Reservation System (Mars), it "committed heavily" to the Level 6, but had a great deal of trouble getting TL-6 to run, according to its president, Roger Brewington.

Moreover, Honeywell subsequently sold Mars to International Telephone & Telegraph

(Continued on Page 74)

Burroughs, Honeywell Profits Dip

Both Burroughs Corp. and Honeywell, Inc. reported third-quarter earnings below those of comparable 1979 earnings, while Control Data Corp.'s earnings for the latest quarter were flat.

Earnings for Burroughs' third quarter were $42.1 million, or $1.02 per share, down from earnings of $61.9 million, or $1.5 per share, in the same quarter a year ago. Burroughs also reported a decline in earnings for its second quarter, the first such drop in 17 years.

Revenues for the period were $699.3 million, a slight 4% increase from revenues of $672.3 million in the 1979 third quarter.

Year to Date

For the year to date, earnings were $150.7 million or $3.65 per share, down from the $173 million, or $4.22 per share, earned for the first nine months of 1979. Burroughs' Vice-Chairman and Chief Executive Officer W. Michael Blumenthal said the firm does not expect to build profit momentum in the final quarter and expects earnings for the year to be approximately $6 per share.

Incoming orders softened during the third quarter, he noted.

Revenues for the nine-month period reached $2.1 billion, up 8% from $1.9 billion in the prior year.

At Honeywell, consolidated earnings for the third quarter were $47 million, or $2.11 per share, down from $54.5 million, or $2.49 per share, earned in the third quarter of 1979.

Delivery shortfalls of large computer systems damaged the revenue of both Honeywell and its European associate, CII Honeywell Bull, and were the major cause of the third-quarter earnings decline, according to Ed Spencer, chairman and chief executive officer.

Spencer said the firm had solved its large computer production problems and expected 1980 earnings to meet or exceed those of 1979.

Revenue for the third quarter totaled $1.2 billion, up from just over $1 billion in the same quarter a year ago. For the first nine months, Honeywell's revenues were $3.5 billion, compared with $2.9 billion a year ago.

Nine-month earnings reached $150.7 million, or $6.70 per

(Continued on Page 76)

Memorex Loss $26 Million

SANTA CLARA, Calif. — Memorex Corp. posted a $5.6 million or 88 cents per share loss for its third quarter, bringing to $26.2 million the company's total loss for the year.

For its third quarter, Memorex's revenues rose to $189.9 million from $185 million in the third quarter a year ago.

The company posted a pretax loss of $6.2 million, of which $2 million was attribut-

(Continued on Page 76)

CSC and Five Employees Plead Innocent to Fraud

ALEXANDRIA, Va. — Computer Sciences Corp. (CSC) and five employees pleaded not guilty to charges of defrauding the government in obtaining a federal teleprocessing services contract in 1972.

The pleas and request for a jury trial were entered in U.S. District Court here Oct. 17 by attorneys for CSC and three present and two former employees. A consultant to CSC, also charged in the 57-count indictment, pleaded not guilty as well.

The indictment, handed down by a grand jury here Oct. 8, alleged CSC and its employees bribed a federal contracting officer to help the firm win the governmentwide time-sharing contract.

The contract reportedly earned the company more than $100 million before it expired in 1977. CSC also fraudulently overbilled the government for certain services offered under the contract, the grand jury said [CW, Oct. 20].

District Judge Albert V. Bryan Jr. set the trial date for Feb. 2.

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GSA Contract #GS-00C-02234 3-31-80

Honeywell Blamed for Missed Opportunity

By Connie Winkler
CW Staff

NEW YORK — "I saw a window in time," the grayed William M. Selden recalled. "Now we may have missed our opportunity."

Selden, one of the developers of Cobol, foresaw the move to small, customized systems by small businesses that had formerly gone to service bureaus for payroll processing, for instance. So in 1977 he decided to move from a large service bureau in Rochester, N.Y., to New York City, where he would not only operate a service bureau, but would develop and market systems, especially for restaurants.

Selden was sold on Honeywell, Inc.'s then-new Level 6, and Accusystems, Inc. ultimately became a beta test site for Level 6 multi-user software, TL-6.

Today Selden and Cynthia Mason, his wife, are bitter. They have yet to sell a payroll system, have invested all their family savings in the operation and have lost the $750,000 they raised by selling stock. Their Level 6 machine is hobbling along processing only one program at a time, and they have turned to marketing other OEM systems to survive.

Long Out of Control

How did the problems with the Level 6 go on so long and get so out of control?

"They kept telling us it was our fault," Mason recalled about the innumerable times when the system wouldn't work. "They impugned our honor."

Selden and Mason were doing the programming from scratch and believed it would work. But the programs wouldn't run. "Sometimes we would load them, press start and they would abort. Sometimes we couldn't even load them," Mason said. "This drove one of our men close to a nervous breakdown."

Honeywell in response would say the programs were too big, whereupon Accusystems would keep breaking them into smaller pieces, Selden said.

"What size can the system accommodate?" Selden recalled asking Honeywell.

"We can't tell you," the Honeywell representative answered.

Accusystems was constantly on the phone to Honeywell headquarters. "All we knew is that when we kept calling, we found someone else was in charge," Mason said.

More Memory

In late 1978, when the transaction language (TL-6) software still didn't work, Selden and Mason were told they had not ordered the right equipment. They added an additional 32K bytes of memory, although they were initially told 32K was adequate.

They had also been told their Level 6 would support a tape drive. Only by reading technical documents in mid-1978 did they discover that TL-6, now called MOD 200 by Honeywell, would not support tapes, and was never intended to. Accusystems had a tape drive sitting there.

After the Accusystems programs were successfully run on a Honeywell test machine, Selden was told his machine needed an additional piece of hardware known as the Multiline Control Board (MLCB). In March 1979, an MLCB was installed in the machine. It didn't work, but it remained in the machine.

The system continued to work only haphazardly despite work by Honeywell systems engineers on the system and despite Selden's numerous pleas, letters and telegrams to the corporation, he said.

Experience Chronicled

Selden and Mason chronicled their experience with TL-6:

"21 February 1978. The software did not seem to work exactly. The diagnostic routines could not be read from the disk (the one that had been delivered to my home). Replacement will come tomorrow from Boston via Federal Express."

"14 April 1978. More work accomplished, but system occasionally locks up and has to be restarted. No files lost. Began to be plagued with aborts. Discovered that we could use either terminal fairly reliably, but couldn't use both at the same time."

Finally, in July 1979, an Accusystems employee found the disabled MLCB still in the CPU. He pulled it out and put it on the floor; the system worked — processing one program at a time. That MLCB had been taking up memory, although not working.

Accusystems this month filed suit against Honeywell in U.S. District Court for the Southern District of New York.

Selden and Mason are now working hard to market other OEM systems and have switched to MOD 400 operating software, which works "pretty well," according to Selden.

Three Users Sue Honeywell

(Continued from Page 73)

Corp. Questioning whether the sale was under way at the time Computing Accounting ordered the Level 6 to run with Mars, the firm's lawyer, Thomas West, noted that the Computer Accounting vs. Honeywell suit covers possible antitrust violations as well as charging breach of contract, fraud and misrepresentation.

Computing Accounting "managed to survive. We're still hanging in there," Brewington said, largely because of an NCR Corp. 101 it kept running and because it switched to screen-handling software developed for the Level 6 by the Paul Hoberg firm of Los Angeles.

Basic Computer Systems

To Basic Computer Systems of Long Beach, Calif., a Basic language compiler is basic. "The language we use is Basic. We took contracts with end users that were going to code in Basic," President Richard L. Paulsen recounted.

Basic Computer Systems signed an order with Honeywell in late 1977 to purchase 40 Level 6 systems over a 24-month period. The firm intended to remarket to four or five vertical markets, including CPA, accounting, advertising and stationery firms.

However, Honeywell never produced the Basic capability, according to Paulsen. Basic Computer Systems has installed six or seven Level 6 systems, but "for each and every one we have had tremendous losses. We've had to reprogram them in Cobol," Paulsen said.

Honeywell also promised, according to Paulsen, that a Level 6 with 32K bytes of main memory could handle four terminals. "It can't do that today," he maintained.

"It put my business back two to three years," he added.

Asking $38 Million

Basic Computer Systems is asking $38 million in damages in its suit, filed in April in California Superior Court in Los Angeles. It is seeking both compensatory and punitive damages, alleging misrepresentations in Honeywell's marketing techniques, according to Walter Lack of the Los Angeles firm of Engstrom, Lipscomb and Lack.

Basic Computer Systems is also claiming Honeywell has been "selective and discriminatory" in its distribution of Level 6s, sending them to large OEM customers and its international divisions.

When its Level 6 effort bombed, Basic Computer Systems had to start over again building systems, Lack said. He is perturbed with Honeywell's argument that the statute of limitations on the OEM agreement signed by Basic Computer Systems has run out and therefore the firm cannot sue.

The OEM agreement would have punished Basic Computer Systems for not selling a system that was unavailable, Lack said.

Basic Computer Systems has requested a jury trial, but Lack does not foresee any court proceedings on the case for 12 to 18 months.

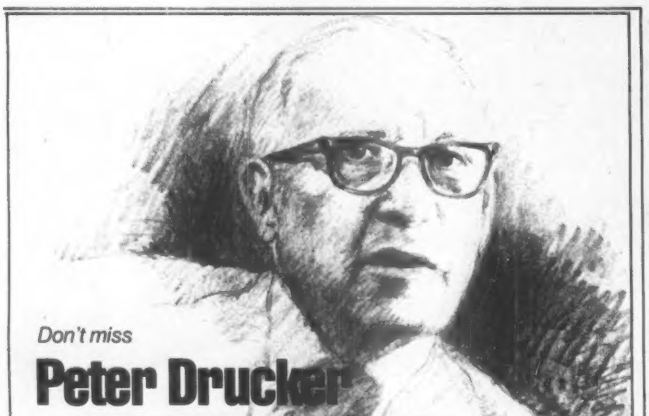
Accusystems Suit

Accusystems, Inc., a service bureau that in 1977 wanted to get into the payroll systems business, and its principle, William M. Selden, are seeking more than $1.5 million in compensatory damages and $6 million in punitive damages for Honeywell's alleged failure to deliver working TL-6 software. Selden and his wife, Cynthia Mason, strongly contend that their business has been set back immeasurably.

Accusystems charged it was promised software with on-line processing capability and was assured the Level 6 Model 36 with 32K bytes of memory — it ultimately had to be boosted to 64K bytes — would support tape drives, none of this happened, according to its suit.

Accusystems' lawyer, Thomas K. Christo, called the Level 6 situation an "old story" of an intercorporate Honeywell fight between MMO and the regular Data Products marketing group. "They decided in midstream not to develop a product [that] they said had already been developed," Christo said.

The Accusystems action has been brought in Federal District Court for the Southern District in New York.



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SPECTRUM 80

U.S. Policy About-Face Allows Firms to Sell China Military Support Gear

By Bohdan O. Szuprowicz
Special to CW

Since Secretary of Defense Harold Brown's visit to China in early 1980, there has been a shift in U.S. policy with regard to export controls on strategic technology and products to that country. Until recently China was included under the Warsaw Pact country group "Y," but it has now been moved to a new country group — "P" — in the U.S. Department of Commerce Export Controls Administration.

What this means is that the U.S. has formally abandoned the principle of "evenhanded" treatment of trade with China and the Soviet Bloc countries.

As a result, certain types of military support equipment and advanced technology products with potential military applications may now be sold to China. These include air defense radars, radio and tropospheric communications equipment, helicopters, truck tractors and electronic countermeasure devices.

The official position is that the U.S. still has no intention to sell lethal military technology to China, but high-level delegates from the Chinese military establishment have already begun to visit American manufacturers and research centers engaged in military technology development and production.

Included on the itinerary of Chinese military experts recently were also such computer manufacturers as Honeywell, Inc. and IBM, as well as military equipment production facilities of Westinghouse Corp., General Electric Co. and AM General Corp.

'Dual-Use Technology'

The name of the game is now "dual-use technology," which includes such previously embargoed products as computers with metal-refining and petrochemical applications and security communications equipment. In fact, computers appear to be the main dual-use technology products that China wants to purchase at the present time, and some manufacturers have already entered into negotiations for precedent-setting sales in this regard.

Leading among those is Burroughs Corp., which applied for a license to export a B6800 computer system for installation in Beijing under the United Nations Development Program. This sale is unusual because the B6800 system's processing data rate (PDR) is nearly twice as large as those of the few large computers previously licensed for export to China.

Chinese End Users

In addition, it is the first application to license a system that will have multiple Chinese end users. This is significant because under such conditions it is almost impossible to demand end-user statements guaranteeing that the system will not be used for strategic purposes by some of the users.

An even more interesting proposal is being advanced by Honeywell, Inc. It involves the transfer of manufacturing, software and training capabilities for a licensed production in China of about 60 Honeywell Level 50 large-scale computers and some Level 200 minicomputers per year.

Valued at about $100 million, this proposal is being readied for presentation in Beijing in late 1980, as soon as technical data export licenses are granted by the Export Controls Administration.

For Aircraft Design

Another computer that has never been exported to a communist country is the Prime Computer, Inc. 650, whose manufacturers are now awaiting an export license for shipment to the Beijing Institute for Aeronautics and Astronautics. This contract is valued at $400,000, and the Chinese end user is taking great care to provide end-user statements to support its intended use of the machine which is slated for educational training in aircraft design.

At the same time, China's aerospace industry is planning to phase in new supersonic fighters, organize research and development of a cruise missile and further develop the existing strategic missiles of China.

On top of these developments comes the announcement by the Xinhua News Agency of China recently that China is embarking upon a program to establish a national input/output analysis system.

Six economists at the Institute of Systems Sciences of the Chinese Academy of Sciences are drawing up proposals for compiling the first national input/output table by 1981. This will require additional and powerful computers, which will undoubtedly be used to compute the impact of military modernization on China's economy.

All the signs are pointing to the fact that if Sino-Western rapprochement continues on its present course, there is little question that vast new markets will be shaping up in China for all types of information processing technologies and products.

PE Reorganizes Marketing Unit

OCEANPORT, N.J. — Perkin-Elmer Corp. has reorganized the marketing group of its Computer Systems Division, splitting the former marketing department into two specialized functions.

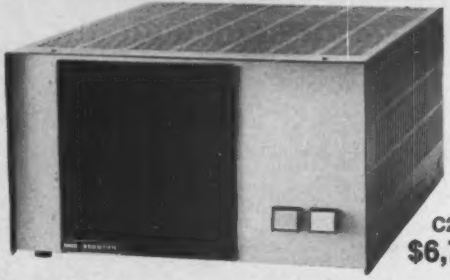
As restructured, the marketing operation is composed of the Marketing Department and the Product Management and Planning Department.

Heading the Marketing Department is Barry Rosenbaum, who joined the Computer Systems Division from the company's U.S. Sales Division.

The department is responsible for establishing and implementing the division's worldwide strategies within its target markets.

The Product Management and Planning Department is responsible for planning, specifications and management of all the division's products. A director for this department has not yet been named.

A new small 10 Megabyte System from the leader in Winchester based microcomputers.



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ASI

SPECTRUM 80

CDC Third-Quarter Earnings Flat; Honeywell, Burroughs Profits Dip

(Continued from Page 73)

share, down from $175.4 million, or $7.88 per share, earned for the first three quarters of 1979.

CDC Up Slightly

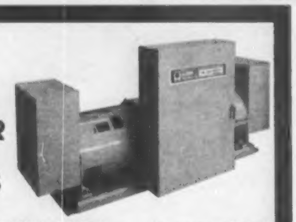
At CDC, consolidated earnings edged up slightly, reaching $40.2 million, or $2.31 per share, compared with earnings of $37.8 million, or $2.19 per share, in the same quarter a year ago.

For the year to date, corporate earnings totaled $114.4 million, or $6.59 per share, up from the $100.4 million, or $5.82 per share, earned in the comparable 1979 period.

Revenue from the computer portion of the firm's business totaled $698 million, up 23% from revenue of $566 million in the third quarter a year ago.

For the year to date, revenue from computers was just over $2 billion, representing about 73% of the total corporate revenues of $2.7 billion. Last year computer revenue for the first nine months totaled $1.6 billion, or about 70% of total corporate revenues of $2.2 billion.

CDC said the gain in revenue from the computer operation during the third quarter was primarily from strong OEM sales of peripherals.



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Amdahl Net Up 300%

SUNNYVALE, Calif. — Amdahl Corp. reported a 300% gain in earnings for its third quarter, but earnings for the year so far are roughly half of those reported for the corresponding 1979 period.

For its latest quarter, Amdahl's earnings were $5.8 million, or 31 cents per share, up from $1.9 million, or 11 cents per share, in the same period a year ago.

Year-to-date earnings totaled $8.6 million, or 47 cents per share, compared with $16.6 million, or 94 cents per share, for the first nine months of 1979.

Revenues for the third quarter totaled $99.7 million, up from $78.3 million a year ago. For the nine-month period, revenues reached $286.3 million, compared with $233.3 million last year.

All results are restated to include Tran Telecommunications Corp., acquired by Amdahl during the latest quarter.

"Third-quarter shipments continued at a high level, which, with a greater percentage of outright purchases, resulted in a substantial increase in revenues and earnings," said John C. Lewis, Amdahl's president.

Memorex Posts $5.6 Million Loss

(Continued from Page 73)

able to inventory charges resulting from a reduction in scheduled production of the firm's disk cache product.

By comparison, earnings for last year's third quarter totaled $7.1 million, or 87 cents per share.

For the year to date, Memorex's revenues reached $560.5 million, up 3% from revenues of $544.2 million a year ago. The loss of $26.2 million, or $3.93 per share, compared with a gain of $29.4 million, or $3.67 per share, for the first nine months of 1979.

The company's operating results were impacted by continuing high manufacturing costs and inventory charges, start-up costs on new products and reduced equipment sales to third-party financing institutions, Clarence W. Spangle, chairman and chief executive officer, said.

Sales to third-party financing institutions were down 14.5%.

However, Spangle said the third-quarter results represent a reversal of the earnings downtrend during the past year and a half. "Particularly encouraging was the measurable reduction in selling, general and administrative expenses," he noted.

Nickels & Dimes

Timeplex, Inc. announced that its registration statement for a public offering of 500,000 shares of common stock for the company and another 69,288 shares of common stock for selling stockholders was declared effective by the Securities and Exchange Commission.

$ $ $

Control Data Corp. has filed a registration statement with the Securities and Exchange Commission for a proposed offering of 1.5 million common shares.

$ $ $

MSI Data Corp. has been approved by the American Stock Exchange to list 2,281,278 common shares of company stock.

$ $ $

NBI, Inc. announced the filing of a registration statement with the Securities and Exchange Commission for a public offering of 400,000 shares of common stock.

$ $ $

The Board of Directors at **Cray Research, Inc.** have declared a three-for-one common stock split in the form of a stock dividend. The action is subject to shareholder approval, and a subsequent meeting is scheduled on Dec. 9.

$ $ $

Leasco Corp. intends to purchase up to an additional 1,250,000 shares of common stock of Reliance Group, Inc. at prevailing market prices. Formerly a subsidiary of Reliance Group, the Leasco computer leasing business presently owns 250,000 shares of Reliance Group's common stock.

$ $ $

The board of directors at **Computer Horizon Corp.** declared a two-for-one stock split of that company's common stock payable Nov. 7 to shareholders of record Oct. 17.

$ $ $

Rogers Corp. reported third-quarter profits of $58,000, or 2 cents per share. Profits were down from the 37 cents per share in the same quarter in 1979.

$ $ $

M/A-COM, Inc. has announced plans for a public offering of 4.4 million shares of company stock.

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Network Systems Corp. has filed a registration statement with the Securities and Exchange Commission for an initial public offering of 800,000 shares of common stock.

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National Semiconductor Corp. has filed a registration statement with the Securities and Exchange Commission for a public offering of 1.5 million shares of common stock.

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"**System/38 makes our programming staff more productive. We've developed applications in weeks instead of months. And they're more effective.**"—Norbert Gottenberg, V.P.-Planning & Management Information Systems, United Merchants and Manufacturers, New York City.

"**The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic.**"—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

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Because the IBM General Systems Division's versatile new System/38 is a compact system with many large computer features. Such as distributed online work stations so users don't have to go to the computer; a central data base that makes information easier to retrieve, revise and use; the Control Program Facility, which automatically monitors and manages the flow and processing of data; online program testing, so programs can now be debugged as normal processing continues.

And System/38 has advanced features rarely found in any computer, large or small. Like Single Level Storage, which treats all storage as a single unit and automatically keeps track of it.

And thanks to System/38's streamlined architecture, many functions that previously required programmers' time have been absorbed into the system itself.

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For more information call your IBM General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30301.

IBM

General Systems Division

Supershorts

Century Data Systems, Inc. has developed a new assembly and test area for its small Trident disk drives. The facility improvements include the installation of a material transporter system.

The National Academy of Sciences has established an Initiatives in Research Award to honor William O. Baker, retired chairman of the board of Bell Laboratories, Inc. The award will be presented annually "in recognition of the promise shown by young scientists" and to assist them "in carrying out research likely to lead toward new capabilities for human benefit." Sponsored by Bell Laboratories, the award will include a $15,000 grant.

Nitron, Inc. is starting development of a high-performance silicon gate CMOS technology. When developed, this advanced process will rival HMOS, Nitron said.

The Institute International de Promotion et de Prestige of Geneva, Switzerland, has selected Canada's Northern Telecom Ltd. to receive its International Industrial Award for its emergence as a successful multinational corporation.

Automatic Data Processing, Inc. will be providing computer services for banks installing Bunker Ramo Corp.'s on-line teller terminal systems. In-bank software provided by Bunker Ramo enables transition from manual procedures to on-line processing.

Mitsubishi Electronics America, Inc. (Mela) has been formed to handle Mitsubishi Electronic Corp.'s marketing in the U.S. The company will be based at 2200 West Artesia Blvd., Compton, Calif. 90220.

Executive Corner

- New Senior vice-presidents at STSC, Inc. are Robert Cook, vice-president of market development; Robert Fick, vice-president of finance and treasurer; John Myrna, vice-president of development; and Allen Rose, vice-president and technical director.

- John H. Clark has been appointed president and chief executive officer of Micom Data Systems, Inc. The former president of the Data Products Group at Itel Corp. will head up Micom operations at company headquarters in Dallas.

- Joe Schneider has been elected vice-president of finance at Data Electronics, Inc., where he will be responsible for all financial activities within the company.

- Atlantic Research Corp. has elected William Borten president and W. Gerald Hamm executive vice-president of the corporation. Other promotions include Charles Henderson's move to senior vice-president and the election to vice-presidency of Christopher Robertson, Keith Britton, James Sides, George Summers and George Oss.

- Gregg W. Pace has been named president of Florida Software Services, Inc. and Thomas D. Rogers has been appointed executive vice-president of marketing strategies of the Kirchman Corp., the parent company of Florida Software Services.

- Jack McKittrick has announced his plans to resign as chairman of the board of directors at Plantronics, Inc., effective Oct.31.

- Herbert C. Kutzman has been elected to the newly created position of vice-president of general mechandise systems at Data Terminals Systems, Inc.

- Newly named regional marketing vice-presidents at Northern Telecom Systems Corp. are James Lee III, Southeast region; William Vandervoort, Southwest region; Armond Newton, Great Lakes region; and Gary Sapp, Midwest region.

- William N. Levin has been elected Pertec Computer Corp.'s Peripherals Division vice-president for finance and administration.

- Carl Jeremias has joined Microdata Corp. as group vice-president of domestic marketing and sales.

- Rodger D. Hoff has been elected president of Integral Systems, Inc.

- Vincent F. Titolo has joined Tymshare, Inc. as senior vice-president and chief financial officer.

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Contracts

Telex Computer Products' OEM division announced a muiltiyear contract valued at $10 million with Prime Computer, Inc. Telex will supply Model 6250 dual-density 75 in./sec tape drives and Model 6850 formatters with multidrive capability.

Northern Telecom Systems Corp. has been awarded a $3.6 million order from Cobra of South America, under which Northern Telecom will provide kits for the assembly of the 400 series of distributed data processing systems.

Burroughs Corp.'s Federal and Special Systems Group has been awarded a $12.4 million contract from the Defense and Space Systems Group of TRW, Inc. for an information storage, retrieval and processing network utilizing a number of large-scale Burroughs B6900 and B7800 information processing systems.

GTE has won a $190 million contract from the U.S. Army to produce electronic telecommunications switches for the nation's tri-service tactical communications program.

Systems Development Corp. has won a $5.5 million contract to provide a Meteorological Data Utilization Center for the government of India.

Century Data Systems, Inc. has received a two-year contract from George Foldvary and Associates to provide a combination of 200 Trident and Hunter disk drives.

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At Introduction of Micro-Plato

Norris Attacks Churches' Criticism of CDC

By Connie Winkler
CW Staff

NEW YORK – Control Data Corp.'s chairman and chief executive officer, William C. Norris, chastised U.S. church groups for protesting CDC's presence in South Africa but doing nothing to address the apartheid problem.

At a press announcement for CDC's latest educational product, Micro-Plato, Norris challenged the churches "to get off the sidelines of the South African issue and find a new game where just talk may have benefit."

Norris also proposed a three-year effort to educate one million disadvantaged American youths via Plato.

CDC selected Plato education in South Africa as a priority area and looked to the churches for support, assuming they would be anxious to help poor blacks gain education and training. Church support for education has not materialized, Norris said, and instead church groups are picketing stockholders' meetings.

"They have been advocating various methods of eradicating apartheid that range from investment restrictions and withdrawal by American business to full trade embargos," Norris said. "They stand on the sidelines urging others into action, but are unwilling to get in the game themselves.

"It's the black church and community leaders in South Africa who are most enthusiastic about Plato's potential," he said.

Norris also faulted Wall Street analysts and leading business publications that criticize CDC's business strategy of addressing unmet societal needs as business opportunities.

"My friends," Norris said, "you have a couple of years in which to back off gracefully. By doing so, you will have less crow to eat before Control Data profits become highly visible from serving society's greatest need – better, more available and less costly education."

Norris predicted that Plato, CDC's giant 18-year-old computer-based education effort, will become profitable in 1982-83. After that it will become the largest producer of profit for the company which manufactures mainframes and peripherals and includes Commercial Credit Corp.

Training Plan for U.S.

Besides the effort in South Africa, where 60 blacks are now enrolled at Control Data Institute, Norris predicted Plato and now Micro-Plato can provide high school training and job training for one million disadvantaged American youth.

CDC proposes a three-year program. "By the end of the third year, the stream of disadvantaged students leaving the nation's high schools without an adequate education would be shut off," Norris said.

Outlined by Walter H. Bruning, CDC vice-president of retail marketing, this ambitious education effort would be conducted through four delivery systems: through CDC's approximately 100 learning centers, subsets of the company's business centers, which sell and finance computers for small businesses; through CDC's present large systems marketing staff to other corporations for their employees; through federally funded Fair Break centers, where CDC trains electronics and computer personnel; and through learning centers at Control Data Institutes, which train computer operators and technicians.

Any high school student can take the basic skills course for several hundred dollars at the institute, Bruning said.

The Plato basic skills course will center around preparation for the high-school equivalency exam, General Educational Development.

Norris also announced:

- Increased Plato emphasis on engineering instruction. The increased demand for engineers, which will be aggravated by the massive synfuels program, could be addressed by Plato, which can deliver most of the first two years of instruction, he said.
- A Plato bank teller training program for the 250,000 tellers expected to be needed by the nation's 15,000 banks

Micro-Plato is an off-line, stand-alone microprocessor teacher, whose "books" are flexible disks. It is expected to counteract the high communications costs of using the on-line Plato.

The basic hardware is a Plato Information Systems Terminal [IST II], which contains 32K bytes of random-access memory, a master flexible disk drive and a modem to allow central Plato system access.

Price Says Move to Minis No Threat to CDC

By John Whitmarsh
CW Staff

PHILADELPHIA – Does Control Data Corp., traditionally a large mainframe manufacturer, feel vulnerable because of the move among users to distributed DP [DDP] and minicomputers?

And is CDC, which has unbundled more software from its hardware than perhaps any other vendor, about to rebundle its offerings?

CDC President Robert Price answers "no" to the first question and "maybe" to the second.

Responding to questions after his keynote address at a recent conference here, Price said distributed processing has always been a part of the CDC culture. "We are very much at home with the distributed computing concept.

"I believe there is now, and will continue to be, a need for massive computational power to solve the problems of energy and economics in the decade ahead. So we intend to get on with the business of making bigger and bigger computers and offer more value-added products to go with them," Price said.

The transition of mainframe vendors from simple sellers of cheap hardware to suppliers of value-added commodities is a trend that may accelerate in the 1980s, according to Price.

"Hardware has become commodity-like and more companies will add value – by which I mean software for computer-aided management systems of all kinds – to those commodities," he said.

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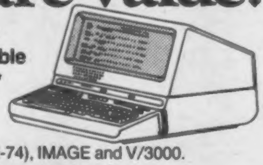

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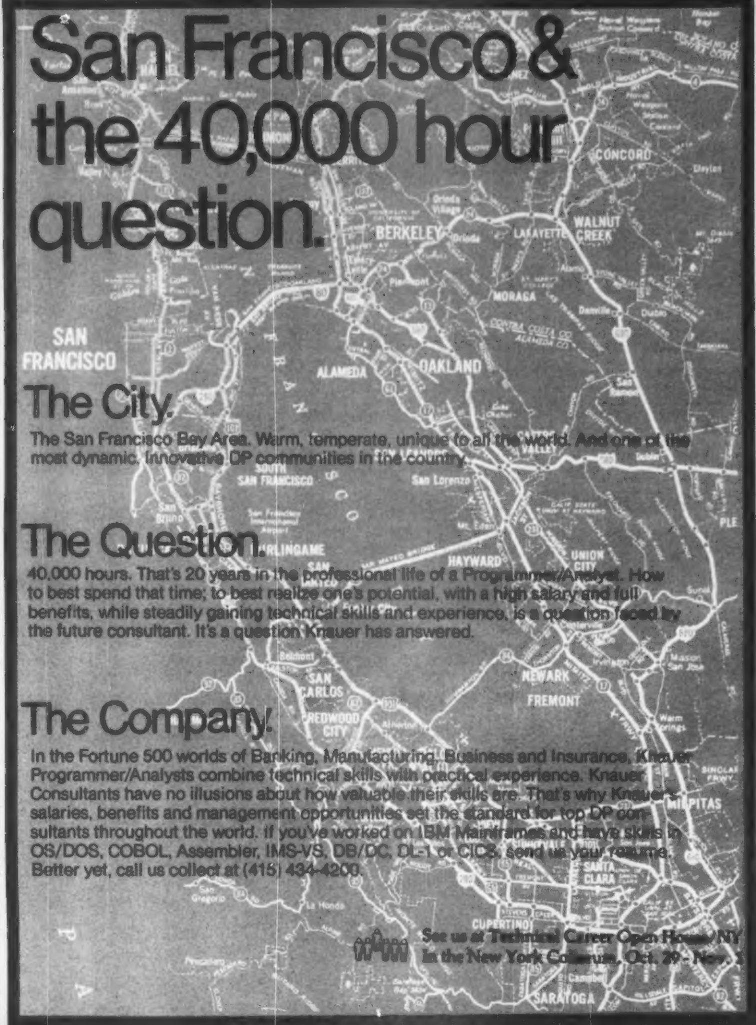

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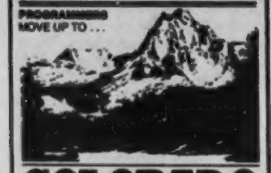

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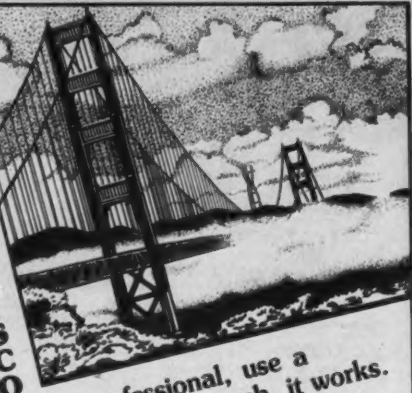

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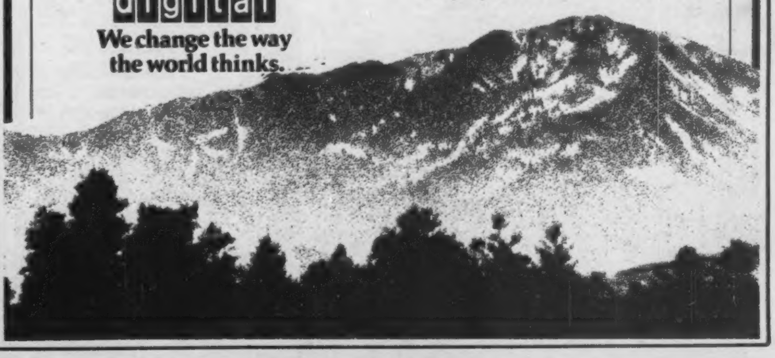

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Major Southeastern Fortune 500 corporation needs Sr. P/A for new D.P. division. Prefer IBM/OS mainframe experience in COBOL, IMS software environment. Reports to Systems Manager. Excellent benefits and relocation package.

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To perform systems programming and maintenance on IBM 370/145. Must have minimum of 2 years programming experience on IBM 360/370 computers with strong ALC and OS/VS1 and VM.

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A full-time position to teach all phases of Computer Programs. Also will work with curriculum development. Must have knowledge of BASIC, COBAL, RPG, FORTRAN, Job Control, System Analysis, and Data Base Concepts. Qualifications: Bachelor's degree in Computer Science or Education plus two years related experience. Closing date for applications is November 15, 1980. Excellent salary and fringe benefits. Send letter of application and resume' to:

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PARADYNE CORPORATION designs, manufactures, markets and services data communication products and systems, and is one of the few companies able to design, manufacture and bring to market an entire family of products that can satisfy both the data processing and data communications needs of today's markets.

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Experience with Microprocessor Hardware and Software and a college degree. Any experience with Z80 Microprocessor is a plus.

SOFTWARE ENGINEER (PIX)

Experience with Z80, Z8001 Microprocessors using Assembly Language and a College degree. Any experience with IBM 3270, Communications, UNIX Operating System or C Language would be a plus.

SOFTWARE DESIGNERS (PROGRAM PRODUCTS)

Experience with Operating Systems Internals on large scale IBM Systems using Assembly Language. Any experience with I/O Drivers would be a plus.

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Experience with the design and development of Operating Systems Software, Data Management Systems or Real Time Communication Systems or Compilers using Assembly Language.

SOFTWARE DESIGNER (PIX)

Experience with 16 BIT Mini Computers, I/O Drivers and Real Time Communication using Assembly Language. Any experience on large scale IBM Systems would be a plus.

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Experience with IBM Operating Systems Internals using Assembly Language and Data Communications (CICS, IMS/DC, ENVIRONI, etc . . .) Must be able to travel and enjoy working with customers.

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Experience with large scale IBM Systems under the DOS/VS Operating System using Assembly Language. Any experience with DOS/VSE, VM/CMS, OS/VSI, or OS/MVS would be a plus.

As a respected member of our dynamic growth picture, you will receive a salary commensurate with experience, a full benefits package and unlimited growth potential. Please forward your resume, outlining work and salary history, in confidence to:

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Director of Professional Recruitment

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Below is a partial listing of fee paid positions currently open. Call or submit resume with salary history in confidence.

PROGRAMMER ANALYST. $17-$20,500 for P/A to help this firm convert from S3/15D to 4331. CCP or DOS on-line experience needed.

PROGRAMMER ANALYST. $22,000 for person to work on 4341. This progressive client prefers CICS command level background.

IMS EXPOSURE. Two of our major companies are currently seeking IMS professionals. $25,000.

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If interested, send your resume in confidence to Joe Rinde, Tymshare, Inc., 20705 Valley Green Drive, Cupertino, CA 95014.

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ADP the computing company

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Automatic Data Processing, the world's leading computer services company, is looking for a talented Technical Writer to join a start-up group aimed at providing time sharing products and services. This individual will have responsibility for all phases of documentation development from initial design and writing through final production. Major emphasis will be on the development of applications-oriented materials directed at non-data processing personnel.

Involvement will also include the creation of education and training materials as well as participation in the devleopment of sales and marketing literature. In essence, this individual will play an important role in the successful delivery of this new time sharing service to the marketplace.

This position requires a college degree and 3-5 years experience in developing technical/user documentation in a data processing environment. Strong written communication skills, DBMS and time sharing experience required. Knowledge of the securities industry desirable.

Please call Gary Zander at
212-344-6010

or forward resume with salary history in confidence to: G. Zander

Automatic Data Processing, Inc.
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SENIOR ANALYST

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SYSTEMS

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Excellent upper level position for technically oriented manager. 4+ years FORTRAN programming with responsibility for evaluation of hardware and software in background. HP 3000 experience is a plus. Overall management responsibility for design through implementation with heavy user interface. Newly installed HP 3000 3. $35,000.

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B.S. in Computer Sc. + 1 yr. exp. in job or in computer programming. Computer graphics software and data base development & maintenance; real time programming using PDP 11/70 & RXS-11M operating system in Fortran & Assembly. Map plotting program using CALCOMP software & plotters; Technical procedure analysis and trouble shooting, debugging & documentation. $1,567.50/mo., 40-hr. wk.

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Principal Lecturer in Computer Sciences
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The New South Wales Institute of Technology is established to provide a wide range of courses for those entering or already employed in industry, government and technological fields.

The School offers a bachelor's degree in Computing Science, a post-graduate diploma in Data Processing, and a Master's Degree by Research and Thesis. It is planned to introduce a Master's Degree in Information Science by course work in 1981.

The School has a number of laboratories and a PRIME 550 Computer. The Computer Centre is currently proceeding with the installation of a large Honeywell network which will include a Level 66, five Level 6 computers and some 200 terminals. The School is active in research and consulting to industry. The current academic establishment is 37 staff, divided into four specialist Units: Computing Systems, Information Systems, Computing Methods and Business Computing. The Principal Lecturer would also be appointed as Head of the Department of Computer Science for a period of three years in the first place. This Department would comprise the two Units of Computing Methods and Computing Systems.

Computing Systems includes systems architecture, operating systems, languages and processors, performance evaluation, and microprocessors.

Computing Methods concentrates on two areas, the teaching of programming techniques, and on advanced applications such as artificial intelligence, computer graphics and theoretical computer science.

The successful applicant will have a doctoral degree and will have demonstrated leadership on one of the above fields. The Principal Lecturer will have a major role in the planning of this rapidly developing School and will be given specific responsibility for certain aspects of its administration.

Salary will be within the range of $A29,012; $A30,182; $A31,369 p.a.

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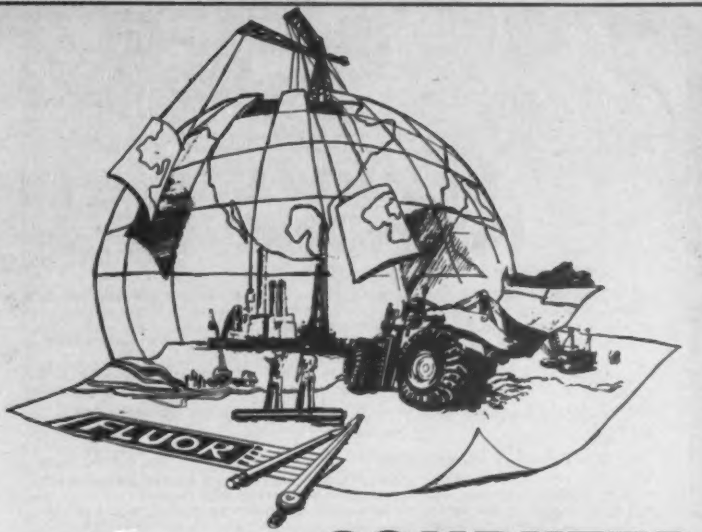
Applications close on November 28, 1980. Applicants should arrange for three confidential referees' reports to arrive by the same date. Written applications should include: address; phone number; personal particulars; evidence of qualifications; publications; research work undertaken and the names and addresses of the referees contacted. Applications and referees' reports are to be sent to:

The Commissioner
N.S.W. Government Office
6th Floor
7 West 51st Street
NEW YORK, NY 10019



COMPUTER PROFESSIONALS
Overseas Opportunities With Fluor in Saudi Arabia

Fluor Engineers & Constructors, Inc., a world leader in the design, engineering and construction of process facilities for the energy and natural resources industries, is currently seeking several key individuals to join our Jobsite Computer Services Department.

The hardware configuration at the jobsite in Saudi Arabia consists of two IBM 4341 processors and related peripheral equipment. This configuration is to be utilized for data communications to and from the Irvine home office computer and jobsite processing of construction systems. The construction systems would include payroll, labor distribution, financial, cost and scheduling control, and material control and warehousing systems.

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This position reports directly to the project construction directorate. The candidate should have at least 10 years of diversified experience in a large data processing installation, 5 years of which should be in a supervisory capacity. A degree in Computer Science or Engineering is preferred.

APPLICATIONS ANALYST/PROGRAMMERS (4)
3-5 years' experience in development, installation and maintenance of COBOL application systems (payroll, financial, cost and scheduling, material control systems).

SYSTEMS PROGRAMMERS (2)
3 to 5 years' experience in installation and maintenance of operating systems (MVS/SP) and communications software (ACF/VTAM).

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Responsible for directing the computer, data entry and data control operations at the jobsite. Minimum 3 years of supervisory experience in large computer installation is required.

Those accepting overseas assignments with Fluor in Saudi Arabia will receive outstanding compensation and benefits including:

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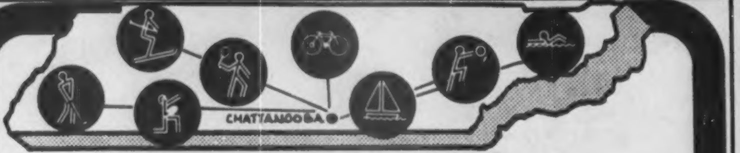

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Our plans for the 80's include:

- **evolving from an RJE—BATCH operation to an On-line interactive data base environment.**
- **implementation of a distributed processing network of IBM 4300 systems.**
- **upgrading of all applications to use state-of-the-art hardware and software technology.**

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TRW
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The Minnesota School Districts Data Processing Joint Board (TIES), an educational data processing cooperative located in St. Paul, Minnesota, is seeking applicants for the position of Executive Director. The Joint Board provides administrative, instructional and research services to over 60 elementary-secondary-vocational educational agencies in Minnesota. Masters degree in educational or business administration required. Doctorate preferred. Eight (8) years of general data processing administrative experience required. General educational administrative experience preferred. Submit resume and letter of application to:

Mr. Howard N. Seim, Chairman
Minnesota School Districts
Data Processing Joint Board
1925 West County Road B2
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Application deadline:
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Submit resume, with salary history, ATTN: DEPT TA 100, or call:

Robert G. Bearden
V. P. Marketing
404/934-2200

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computer professionals

L.D. Schreiber Cheese Company Inc., a fast growing national, private label food manufacturing company with sales in excess of $500 million per year, is rapidly expanding the corporate data processing staff to meet the needs of the 80's.

We offer challenging opportunities in an expanding on-line database environment for experienced:

- **PROGRAMMER/ANALYSTS**
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- **SYSTEMS PROGRAMMERS**
- **MANUFACTURING DATABASE MANAGERS**

These positions require a BS degree or the equivalent, plus several years experience.

Currently we are running a 370/148 under VM with CMS, SCRIPT/370, RSCS, and OSE with a 4341 on order. The on-line database portion consists of OS/-VS1, IMS, CICS and DMS. WE are establishing a local and nationwide network of the latest teleprocessing hardware.

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PROCESS COMPUTER ENGINEERING

When it comes to process computer systems we at Northeast Utilities have it all together. We've "been there". More importantly, we know where we're going! Our central Process Computer Engineering [PCE] group is in its second decade with a Corporate commitment, visibility, purpose, and capability that is the envy of the electric utility industry.

The key to our accomplishments is our in-house approach. PCE functions as an internal systems house—in the full sense of the term—with total system supply and system life cycle support responsibilities. Our areas of involvement include:

GENERATION

- **Nuclear Plant Computer Systems**
- **Fossil Plant Computer Systems**
- **Hydroelectric Plant Computer Systems**
- **Environmental Monitoring Systems**
- **Equipment Vibration Monitoring**
- **Plant Site Security Systems**

TRANSMISSION/DISTRIBUTION

- **Bulk Power Transmission Scada**
- **Automatic Generation Control**
- **Power Control Center Operations**
- **Load Management**

Process computer engineering is a rigourous pursuit. This is no place for the uninitiated. It demands the utmost in engineering and people skills from its practitioners.

Our PCE staff of engineers faces an unprecedented work-load, both near and long term. We invite your investigation of numerous PCE career openings. If you have three [3] or more years of related experience, and seek a challenging state-of-the-art professional opportunity, please call collect:

ANN JOHNSON AT [203] 666-6911 Ext. 5103
[She will put you in touch with the appropriate engineering manager.]

Or send your resume in confidence to:
Ann Johnson, Employment Coordinator

NU NORTHEAST UTILITIES
P.O. BOX 270.
HARTFORD, CONNECTICUT 06101

An Equal Opportunity/
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Our 1000+ Clients in 48 states are paying fees for Computer Personnel with the following background/experience. Most listings represent duplicate positions in different geographical locations. Est. 1967.

Data Base Analyst	30K
EDP Director/Mgrs.	To 40K
Sales (Hardware/Software)	Open
EDP Auditor	18-28K
Tech Services Mgr.	40K
Project Leader	35K
MBA's (EDP Background)	35K
Management Sci/O.R.	35K
MS. Ph.D. Computer Sci	40K
Systems Prog./Tech Spec.	40K
On-Line Financial Sys	30K
IMS-B/A	28K
Mini Micro	45K
Scientific Programmer	16-40K
Cobol Prog. OS or DOS	13-28K
Sys 3/34/38 Specialist	30K
MICR Programmer	25K
Real Time Programmer	25K
CICS Programmer	24K
Jr. Prog. Cobol/ALC/PL-1	22K
B.S. Entry Level	22K
Vender REP	30K
RPG II Programmer	25K
Manufacturing Specialist	35K
B.S./M.S. Mathematics	22-30K
Military Computers	35K
Consultants	25-38K
Tech WRI/Documentation	21K
Process Control Experience	35K
Graphics	20-30K
Network Design	40K
Computer Design	35K

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Computer Specialist
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APPLIED DATA RESEARCH is seeking DOS/VS and VSE system software specialists to develop a wide variety of advanced software products. Top salaries, state-of-the art projects, and excellent growth opportunity. Outstanding environment for those who want a challenging career. Reply in confidence to:

Director, Software Products Division
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ADR

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LOOKING FOR A NEW STATE-OF-THE-ART DEVELOPMENT PROJECT?

Harris Composition Systems has long been a leader in the development of automated newspaper systems. Expertise in this field, combined with the wealth of technology available within Harris, gives us a solid base to draw from in the development of office word processing systems.

Call today if your background includes any of the following:

MICROPROCESSOR SOFTWARE DEVELOPMENT
MINICOMPUTER SOFTWARE DEVELOPMENT
APPLICATIONS PROGRAMMING
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Join our team and participate immediately in a technically challenging project. Furthermore, you will be able to experience the casual, family oriented lifestyle on the Atlantic coast within easy driving distance of Florida's most inviting recreational attractions. Melbourne, Florida—the cost of living is low, but the quality of life is high.

Call or send resume to **Daphne Cumberland, Harris Composition Systems Division, P.O. Box 2080, Dept. CW 10/27, Melbourne, Florida 32901. 1-800-327-0482.**

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

An Equal Opportunity Employer M/F/VH.

DATA PROCESSING PROFESSIONALS

Consulting opportunities for problem solvers who prefer a large-scale environment

We're working toward an advanced Distributed DP network at Colonial Penn, pioneer in marketing specialized group insurance by mail. The environment is on-line and offers pivotal involvement to professionals who can provide consulting type support to analysts, programmers and clients. Those qualified will work at the systems level, integrating applications with operating systems, and will participate in special task force assignments.

TECHNICAL ANALYST

To identify and solve problems with applications program logic, compiler and operating system interfaces; and to participate in technical projects. Must have 3 years programming experience on L66 systems, and demonstrated ability to develop and document technical procedures and routines. Solid understanding of JCL, TSS, FMS, IDS, utilities and slave dump analyses essential.

ON-LINE SYSTEMS CONSULTANT

To provide liaison between clients and data management. Must have 2-3 years experience in applications programming involving on-line systems design. Data base knowledge and TDS or DM IV-TP experience preferred.

Competitive salaries are enhanced by an outstanding benefits package. Please send resume including salary requirements to Mr. Michael McDonald.

Colonial Penn Group
5 Penn Center Plaza
Philadelphia, PA 19103
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LOGIC DESIGN ENGINEERS

If your career is developing just one step at a time, look into BRAEGEN CORPORATION, a quality manufacturer of computer-based terminal systems ideally located in Cupertino. In one year we have grown from 100 to 600 employees, and have expanded our sales and service division from 6 to 52 cities.

A move into new product development has created challenging opportunities for innovative Logic Design Engineers at BRAEGEN.

Candidates must have knowledge of LSI circuits, microprocessor control design and state-of-the-art microprocessors. Familiarity with communications protocols desired. Requires 4 years' logic design experience, plus a BSEE or equivalent.

BRAEGEN offers excellent starting salaries and benefits including a paid holiday from Christmas to New Years. Please send your resume or contact **Jim Rook at BRAEGEN CORPORATION, 20740 Valley Green Drive, Cupertino, California 95014, (408) 255-4200.**

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The **BRAEGEN** Corporation

SYSTEMS & PROG MGR To $30,000

SE based industry leader has immediate opportunity for EDP professional to head up Business/Financial Systems & Applications Dept. (15 programmer/analysts in addition to several in Tech. Support in dept.). Co. operates IBM DOS/VS, CICS on-line environment. Client reqs. college dg. combined with good management skills and related technical knowledge. Excellent opportunity for Sr. Analyst or Project Mgr. to assume additional responsibilities. Complete career benefits.

OPERATIONS MGR TO $30,000 NORTH CAROLINA

Multi-billion dollar client, due to upcoming promotion has opportunity available for EDP operations professional to assume total responsibilities for this 80+ person dept. within IBM OS/MVS shop. Client reqs. college dg. combined with good management skills, technical expertise and exposure to financial planning & forecasting as relates to dept. needs. Any mainframe IBM hardware/software will be considered. Complete career benefits.

All positions are employer fee paid to include interview & relocation expenses. For details on the above or numerous additional EDP opportunities at all levels contact Jim Schwab at 704/375-0600 or rush resume in strictest confidence to:

fox-morris
personnel consultants
1742 Southern National Center
Charlotte, N.C. 28202
MEMBER NATIONAL PERSONNEL CONSULTANTS

ROBERT HALF

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SR P/A-Cobol-CICS	$25K
P/A-Basic-Bus Appls	$28K
P/A-Fortran-Bus Appl	$25K
P/A-Dibol-Bus Appl	$25K
P/A-RPG or Cobol	$19K
Prog-RPGII	$23K
P/A-Data Base	$28K
Prog-Neat 3	$20K
Sys Analyst-Cobol-Mfg	$20K
Prog Mgr-Cobol-Burr	$22K

Fee Pd-Relo Pd-No Contract

ROBERT HALF
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135 St. Charles Avenue
Suite 1020
New Orleans, Louisiana 70130
(504) 524-3773

CALIFORNIA

CO PAID RELOCATION-Major Financial institution seeks several P/As & S/As to develop on-line state of the art applications. Large scale IBM req with COBOL or BAL programming experience. Extensive relocation package and excellent benefits. Salary to $35,000.

CO PAID RELOCATION-Large Sales Co seeks OS/COBOL progs. with some time-sharing experience and a desire to learn IMS. They are enlarging existing dist. apps & converting all systems to IMS. Extraordinary benefits, education reimbursement, 4 yr fully vested pension, elaborate bonuses, full relocation. Salary to $30,000.

INTERNATIONAL MANUFACTURING FIRM is looking for a Systems Programmer to support MVS. Experience with VTAM, NCP or IDNS a plus. Excellent company benefits. Salary to $35,000.

the jarvis walker group
3255 Wilshire Blvd., Suite 1503
Los Angeles, Ca. 90010 (213) 384-4900

PROGRAMMER

NCR Programmer Analyst

Work in the growing Computer Service Division of a 441-bed medical center located in central New Jersey. Processing done for other health oriented associations also. Currently running an NCR 8450, 512K Memory, 658 and 656 Disk Drives with the B3 Operating System. Languages include NEAT/3 and BOSS/3 On-Line. Plans include online processing, shared services expansion and COBOL usage. Salary $16,000-$22,000 based on experience. Send resume and salary requirements to: Irvin L. House, Data Processing Manager.

John F. Kennedy Medical Center
James Street, Edison, NJ 08817
OR CALL (201) 321-7702 or 7537
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PROGRAMMER ANALYST OPPORTUNITIES

Datapoint Corporation, the pioneer leader in dispersed data processing has career openings for programmer analysts in our SAN ANTONIO office.

JOIN THE "OUT-THINK" TEAM WHERE NO ONE IS A CODER!

While we prefer a degree, your demonstrated skills are what will make the difference. Those professionals with financial and marketing applications experience will have the inside track.

IMAGINATIVE PROFESSIONALS MOVE FAST WITH DATAPOINT!

We can offer you an excellent salary, great company paid benefits, and the advancement potential that makes Datapoint the place where you can move fast. For prompt consideration, please send your resume including salary history to:

Jim Ramsey
Datapoint Corporation
9725 Datapoint Dr., MS M-84
San Antonio, Texas 78284

We are an equal opportunity employer M/F.

DATAPOINT

Data Base Project Leader

Annual sales approaching $1 billion reflect much more than just growth at National Semiconductor. It also reflects our commitment to provide quality people with the resources they need to reach their goals, as well as ours.

This position offers an opportunity to lead a team responsible for the development of a data base system for a major new product. This product will be a fully redundant (both hardware and software) high-integrity, mini-computer system. The data base will be required to support high-volume transaction throughput in an on-line, shared data environment.

We're looking for an experienced software designer with at least a BS and a sound working knowledge of the following areas: data base models, file and record level locking, access mechanisms, transaction back-out and recovery techniques. Some supervisory experience is also required although we'll consider someone currently employed as a senior programmer or equivalent.

Please send your resume, in complete confidence, to **Nancy McAuliffe, Professional Employment, National Semiconductor, P.O. Box 60879, Department 3-51-210, Sunnyvale, CA 94088; or call COLLECT (408) 737-5640. An affirmative action employer.**

National Semiconductor

If you didn't know that, you don't know National.

COMPUTER ENGINEERS/SYSTEMS ENGINEERS/SOFTWARE ENGINEERS

NORDEN SYSTEMS invites you to meet our Engineering Managers during...

AFTER 5 INTERVIEWS

Monday–Wednesday
Oct. 27-29

Come to our Melville, Long Island facility between 5 & 8 PM on any of the dates indicated.

With the day's work pressures behind you, come relax and discuss your interests, background and the opportunities now available at Norden Systems.

Highly successful supplier of complete military electronic systems, we're committed to designing advanced new computers from the ground up—as well as to militarizing existing systems. To this end, Norden is forming an elite group of computer professionals at our well-established facility in Melville. Continuing our tradition of creativity and innovation, our activity will employ new approaches extending the state of the art.

In support, we have the nearly $2 million a day R&D budget of United Technologies to draw upon—one of the largest in force in America—and major government contracts carrying deep into the decade. The challenge is without precedent. The opportunities long-term. And the future is what you make it. Immediate openings available for the following:

COMPUTER ARCHITECTS

High level assignments calling for 8 years or more experience in designing computer systems including: implementation of logic design, micro-controlled architecture, cache memory, I/O-memory interface, and CPU structuring. BSEE, preferably MS.

COMPUTER HARDWARE ENGINEERS

Capable of designing circuitry to implement architecture requirements. Complete familiarity with microprocessor-based CPU and peripheral interfaces. Openings at Senior level require 8-10 years experience. Other openings call for 3 or more years experience. BSEE, preferably MS.

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Will be responsible for designing systems to military requirements with state-of-the-art capabilities. Involves interfaces between multiple computers and perpherals, data transfer, telecommunications, error detection and correction techniques, and functioning in hostile, real-time environments. Familiarity with PDP-11 family desirable. Must be able to define system requirements to meet customer specifications. BSEE/MSEE with 8+ years experience for Senior level openings. Minimum 3 years experience for other positions.

MICROPROCESSOR ENGINEERS

Thorough knowledge of standard microprocessor functions, capabilities, limitations. Able to satisfy specifications with available units and determine optional configurations of MPU's. BSEE/MSEE with 5 or more years experience.

SOFTWARE ENGINEERS

Design basic software to perform real-time functions under demanding conditions. Develop operating systems with diagnostic programs and utilities. Capable of developing complete operating systems for unusual processing functions. BSCS or EE (preferably MS) with 2-3 years experience.

If you require further details about these special evening interviews or are unable to attend, call COLLECT any weekday.

Eugene Woisin
(516) 694-0900

Or send resume or brief letter describing your work background to: Personnel Dept., Norden Systems, 75 Maxess Rd., Melville, N.Y. 11747.

For information on opportunities at our Norwalk, Connecticut facilities, contact Kevin Keegan at (203) 852-5406,
303 Norden Place, Norwalk, CT 06856.

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-CONTRACTS, To

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-FULL TIME, To

$35,000

- MINI ASSEMBLER/BASIC
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275 Madison Avenue
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(212)684-6006

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Corporate hqtrs of multi-plant/divisions machinery mfr urgently seeks "polished diplomatic" type to guide/advise all national EDP operations. Be willing to travel and set your career path to Sr. mgmt at division/-group hqtrs in short time (some division Presidents came up thru MIS). $43-45,000 pkg. Contact Debbie Shapiro.

203-324-3399

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111 Prospect St.
Stamford, Ct. 06904

N.C. Opportunities

Programmer/Analysts COBOL - IMS - CICS	22K
Systems Programmers -IMS	33K
Sr. EDP Auditor	30K
Business Systems Designer	27K
Systems Analysts Insurance Bkgd.	31K

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PO Box 11321 Charlotte NC 28209 (704) 525-2160

MELLONICS

IMS PROGRAMMER/ ANALYSTS

(Southern California)

Mellonics Information Center is located just 29 miles Northwest of downtown Los Angeles in the beautiful San Fernando Valley.

We are currently seeking IMS Professionals that can take charge in creating a new multi-company IMS pension system, as well as other related business systems.

MIC has built a nation-wide reputation on delivering cost effective data processing services to customers who span the many functions of modern business. We offer a rare blend of a relaxed, friendly atmosphere and exciting, innovative career assignments.

To arrange an interview appointment:
Call COLLECT:
(213) 887-5039
Jona Hester
Or send resume to:

Professional Employment
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6701 Variel Ave., Canoga Park, CA 91303
Equal opportunity employer M/F

Oklahoma City is OK!

- Senior Programmer/Analyst
- Programmer/Analysts
- Systems Programmer

An immediate 10% bonus is just one of the outstanding benefits you'll receive as part of this fast-growing oil company. Tremendous company growth and increased user requirements have led to an expanding EDP department.

If you are a self-starter who enjoys a challenge and has experience in one or more of these areas:

- 2-5 years systems programming
- 2-5 years oil & gas applications
- 2-5 years financial accounting applications
- 1-2 years data base design/programming

we can offer you an opportunity to be part of a state-of-the-art development team utilizing an IBM 4300 DOS/VSE/DB-DC.

If you seek a company that recognizes personal achievement and offers excellent salaries and benefits, call or send your resume in confidence to:

Jon Shamburger
Texas International Petroleum Corporation
3535 NW 58 • Oklahoma City, Oklahoma 73112
(405) 947-8682 Ext. 323
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TIPCO

Director of Information Systems

A well-known consumer products division of a Fortune 200 company is seeking a strong and aggressive systems professional to provide leadership for our domestic and international systems operation.

The Director of Information Systems is a highly visible position within our organization. The Director reports directly to the Vice President and Controller and is responsible for:

- Systems planning, development and implementation world-wide.
- Management and development of a staff of over 100 employees.
- A 7 million dollar budget.
- Administration of a large centralized computer operation as well as distributed data processing facilities in a variety of locations world-wide.

To be a candidate for this position, you should have experience managing a large systems organization and be able to demonstrate your ability to successfully make the type of business decisions this position requires. Successful applicants must have the following qualifications:

- Minimum of 12-15 years of progressively responsible systems management experience in a large, multi-location manufacturing environment.
- Bachelor's degree required, MBA degree preferred.
- Excellent communication skills. Must be able to interface with all levels of corporate management.
- Exposure to systems planning is essential.
- Experience in charge back systems considered helpful.

We offer an excellent compensation plan that includes a salary commensurate with experience, plus comprehensive benefits.

For prompt, confidential consideration, forward your resume and salary history to:

CW Box 2420
375 Cochituate Rd., Rte. 30
Framingham, MA 01701
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IMS PROGRAMMER/ ANALYSTS

$18 to $28K

San Francisco

Several of our Bay Area clients have immediate openings for IMS Programmer Analysts. Positions require a minimum of 2 years in Data Processing with 1 year in IMS COBOL applications. Prefer Manufacturing, Finance or Distribution Applications. Positions include relocation and excellent benefit packages. Salary commensurate with abilities.

We are consultants to management. For immediate and confidential consideration send detailed resume to **CW Box 2419, 375 Cochituate Rd., Rte. 30, Framingham, MA 01701.**

Employer assumes fee

COLORADO JOB$

Come join one of the fastest growing high technology centers in the U.S. New book, THE COLORADO CONNECTION, TELLS YOU EVERYTHING YOU NEED TO KNOW. Covers Denver, Boulder, Colorado Springs, and Ft. Collins. Employment Guide contains: history, topography, indepth look at contemporary Colorado; aerial photos of cities; details on employment outlook, cost of living, education, housing, the arts and entertainment, and much more. Directory of High Technology Companies contains nearly 400 entries: name, address, phone #; date company was founded; # of employees; description of major products and services; computer systems used. The real growth is just beginning. We believe that no other area in the nation offers more opportunity for the 80's. Author has worked in Colorado as a programmer for over 13 years. Format 8½ x 11, 64 pg. bound book. Send $9.95 plus $1.00 for shipping and handling to: **Magnolia Publishing Co., Box 1054CW, Boulder, CO, 80306.** Visa and MC send # and exp. date or call 1-303-443-8083. Satisfaction guaranteed! 30 day money back return privilege.

THE GOOD NEWS

At Diners Club Operations Center in Denver, we mean business. Other companies are slowing down or laying off but at Diners Club it's business as usual. Our Data Center, is a progressive technically sophisticated environment where continued expansion enables your talents and skills to be called on to make valuable contributions to our progress during the 80's. Extensive automation, data base development and distributive processing, all utilizing the latest IBM technology (IBM 370/3031 OS/MVS) will project us into international communications during the 80's.

These projects have created new opportunity for the best data processing professionals to fill the following positions:

DATA BASE ANALYST

Our development of an IMS data base is well underway. To continue this development we require an individual with 2 years IMS/VS/DB and DB utilities.

IMS/DB backup and recovery experience is strongly preferred or if you are in the IMS/DB-OS/VS1 rut and are ready for a progressive, technically sophisticated IMS/DB-MVS shop we would be interested in speaking to you.

COMMUNICATIONS SYSTEMS PROGRAMMER

Excellent opportunity in a MVS/DL1 environment embarking on a large scale growth plan, encompassing distributed systems in a worldwide network. Strong ASSEMBLER and CICS experience required. Series/1 (RPS, VTAM, NCP) and/or 8100 (DPPX) experience a plus.

Outstanding compensation and benefits package make these positions the key to your advancement and growth during the 80's. Find out more about these exciting opportunities by sending your resume with salary information to Linda Petersen.

Diners Club
10 Denver Tech Center
I-25 and Bellview, Exit 90
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Equal Opportunity Employer

DATA PROCESSING PROFESSIONALS

FOUST, DIER AND ASSOCIATES OFFER EXECUTIVE PLACEMENT IN THE PROFESSIONAL MANNER.

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Manufacturing, banking, forest products, insurance, energy, medical.

Our clients are located throughout the western U.S.and utilize state-of-the-art operations.

If you have experience with the following, you owe it to yourself to contact us.

IBM -

4331-3033-32-31, 370/168-158,
IMS-DB-DC, CICS-TOTAL,
OS, DOS, MVS, VS1, VS2.

We are able to combine career path with lifestyle. Our clients pay all fees and relocation. Some clients include attractive relocation packages, which include real estate. Due to the slowdown in movement caused by the housing situation many excellent positions are now open. Take advantage of these opportunities we offer: confidentially, professionalism, career growth and life style.

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(602) 998-4100

Broward County, Florida

Employment Opportunity

Data Processing Director

(Administrative Officer VI, $31,555 - $44,587)

Large on line dual processing system consisting of IBM 3031 and 370-158 equipment operating on OS/VS I and on a 7 day, 24/hr./day basis, needs an experienced, professional director to assume complete responsibility. This is a central information system servicing all county divisions and governmental agencies. Must be able to deal with elected and judicial officials and numerous other appointed division directors.

Requires a degree in an appropriate field, specialized training in electronic data processing, and extensive progressively responsible data processing experience, which must have included administrative and supervisory duties.

Submit detailed resume, no later than 5 p.m. Nov. 28, 1980 to

County Administrator
c/o Division of Personnel, Governors Club Bldg.
336 S.E. First Avenue, Ft. Lauderdale, FL 33301
Phone (305) [illegible]

Equal Employment Opportunity M/F

PROGRAMMER/ANALYST

In yesterday's environment? Want a real opportunity? An expending company in a growth industry has a need for a P/A with 2 or more years COBOL OS on IBM large scale. Excellent benefit package. To $26K. ALL FEES PAID BY EMPLOYER.

PROGRAMMER (2)

Under-challenged and want more money? Large Memphis distributor has an opening for 2 programmers with 2 yrs. COBOL. Company has DOS CICS shop. High growth and good benefits. To $22K. ALL FEES PAID BY EMPLOYER.

HALF
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Memphis, TN 38119
(901) 683-5800

Systems Analysts
Bring Your Creative Energy
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The City of Seattle is seeking experienced, creative computer professionals to work in our new and expanding large-scale DP environment. Vacancies currently exist at all levels for Business Applications, Data Communications and Operating System/Technical Services. These vacancies offer on-line software development, structured analysis and design with a varied portfolio of computer application with significant new development in the immediate future.

The City offers competitive salaries and an excellent benefits package including medical and dental coverage. The greater Seattle area is well known as an environment appealing to all age groups and offering unlimited recreational opportunities. Cultural activites such as theatre and opera are readily available, as are outdoor activities such as skiing, boating, fishing, backpacking, camping and numerous opportunities for participation in sports.

For an application, call Mary Chapman at (206) 625-2886, or write to:

City of Seattle
OMB/MIS
500 United Pacific Building
1000 Second Avenue
Seattle, WA 98104
Attn: Mary Chapman

AN EQUAL OPPORTUNITY EMPLOYER

SUPERVISORS

Badische Corporation is a multi-plant manufacturer of chemicals, fibers and yarns. These are immediate openings in our central computer facilities at

ANDERSON, SOUTH CAROLINA

Application Software Development

Technical and administrative supervision of 20-25 software professionals involved in the development of manufacturing and financial applications. Ideal candidate will have degree, 8-10 years applications development experience, data base exposure, plus proven supervisory experience. Familiarity and experience with Burroughs Medium Systems desired.

Technical Support

Challenging position for an innovative technical specialist to provide support of a medium scale Burroughs Medium System. Knowledge of B-4000 architecture, the MCP operating system, RJE, CANDE, DMSII, NDL, and Utility software is essential. Candidate should have 4-6 years experience, degree preferred.

If interested, please send resume, including salary history, and indicating position desired, to:
Manager, Professional Placement

Badische Corporation
P.O. Drawer D
Williamsburg, Va. 23185

Badische

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SYSTEMS PROGRAMMER - UNIVAC 1100/60

SUNBELT

EXCELLENT SALARY

Outstanding Southeastern company, Division of major corporation, will soon install a Univac 1100/60 for existing batch operations and new on-line applications.

If you are a systems programmer with experience on OS 1100 and related software, you can become an important part of this exciting installation.

You will enjoy the benefits of an outstanding community: excellent schools and colleges, year round outside activities, numerous civic and cultural opportunities.

No agency referrals accepted.

CW Box 2421
375 Cochituate Rd., Rte. 30
Framingham, MA 01701
Equal Opportunity Employer

EDP OPPORTUNITIES

PROJ Ldr-Bright aggressive OS COBOL on-line D/B	$35-41K
CHECK Process'g-Int'l 3810-1419-CPCS DOS	$30K+
S/A-deg fincl systems	$29K
ANALYST Prog-multi + PDP 11/70 RSTS BASIC + DBA am trvl.	$36K
PROJ Ldr-Foreign exch IBM 4300	$35-45K
SYST Eng commun. SDLC SNA PLI ALGOL	$35K+
PROJ Ldr MIS-Int'l PDP 11/70 RSTS BASIC. Co. car	$37K
SOFTWARE-OS MUS CICS, IMS TSO 370/165	$31K
ADABASE Anal-3.21 natl 310/168/MVS/TSO	$32K+Bon
MGR OPS-Staff 200 state of the art IBM	$50K
SYSTEMS/ANA data collection, deg, on-line concepts	$32K+Bon
4 DAY w/w 36 Hrs COBOL OS lrn CICS	$25K
PDP 11/50-11/70 RSX 11 real time macro 11	$37-40K
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PROJ Ldr-deg OS-COBOL on-line ADABASE-CICS	$35base+
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CMS COBOL 4331 fincl syst	$33K
RPG 2 Systems 3-Mod 15-D-3 wks vac Westchester	$28K
MGR T/A-Audit & review Stds	$33K
4 Day w/w P/A OS COBOL learn CICS/2MS	$25K

Call Bill Barrell (212) 349-3610

WM HARRIS ASSOC
150 Broadway, NY 10038 (agency)

PROGRAMMER

Requirements: Bachelor's Degree from an accredited college plus 2 years experience in computer programming using BASIC. It is desirable that applicants have PDP experience. An equivalent combination of training and experience is acceptable. **Starting salary:** $16,000. Resumes should be sent to **Helen Thomas, Personnel Officer, Guilford College, 5800 W. Friendly Avenue, Greensboro, NC 27410.**

An Equal Opportunity Employer

FLORIDA POSITIONS

Urgently need Programmers, Analysts, and Systems Programmers for Florida and other Sunbelt locations. Experienced individuals needed in financial, manufacturing, and for Software Development. IBM 370, COBOL, CICS, OS/VS, DOS, BAL or Assembler. Others needed with Univac, Burroughs, Honeywell, PDP-11 or NCR experience. All fees, interview and relocation expenses paid. Salaries 15 to 30K. Rush confidential resume and earnings history to:

J.C. Dayvault, President
R.P. RITA, INC.
1211 N. Westshore Blvd., Suite 107
Tampa, Florida 33607

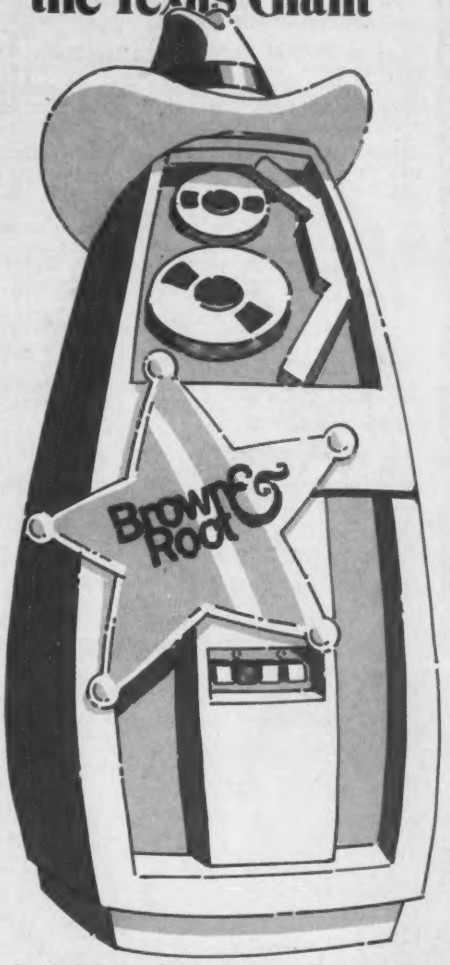
FACULTY POSITION

A Full-time Tenure Track Faculty position in Computer Data Processing is available at Charles County Community College, January 1981. Duties and responsibilities involve teaching Computer Data Processing courses and assist in the Management and Development of Computer Data Processing Curriculum. Qualifications: Masters preferred, Bachelor's required. Closing date Nov. 14, 1980.

If interested, send resume, transcripts and three letters of reference to Charles County Community College, Personnel Dept. P.O. Box 910, La Plata, Md. 20646. EOE/M.F.

Programmers & Analysts

A Computer System with the Brand of the Texas Giant



Continued success and expansion of our worldwide operations has created many new career opportunities. Because our operations are worldwide, we are developing a new, integrated computerized system to support our reputation as the international leader in Engineering and Construction. Its use will be of a scope unequalled by any other organization and we need top professionals to meet the challenge.

Our Computer Services Division supports a diversity of business applications such as Materials Management, Accounting, Project Control and Personnel/Payroll. If you have 2+ years COBOL programming experience in an IBM S370/MVS environment, and a Bachelor's degree, or equivalent, there could be a place for you on the Brown & Root team.

We are also seeking Systems Analysts with a minimum of 5 years experience in a business environment. Large-scale, data base oriented systems development experience, preferably under IMS, using structured design/programming techniques are all pluses and will give your application a considerable advantage.

Brown & Root offers excellent salaries to qualified candidates, along with top benefits and relocation compensation. If your background and education qualify you for these positions, call Sam Gaines at (713) 676-8723, out of state call toll-free at 1-800-231-1357, or send your resume to: P.O. Box 3, Houston, TX 77001 (03-125).

Brown & Root, Inc.
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GRUMMAN DATA SYSTEMS, a subsidiary of Grumman Corporation, is expanding its Washington-based operations. We have immedate openings for Senior Marketing Representatives who can sell ADP systems.

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At GRUMMAN, you will be working for a company that developed systems for the space program and the lunar module. Today, we are using this type of sophisticated engineering technology to develop systems for the ADP field. GRUMMAN DATA SYSTEMS is a total systems company offering design, development, integration, implementation, operation and maintenance capabilities.

With GRUMMAN, you will be a systems specialist and not just the seller of hardware or software. You will perform objectively, counseling our customers on how to design and implement the most effective system for their needs. You will help them solve problems.

Take the first step today by sending us your resume. The more you know about GRUMMAN, the more you will want to work for us. Write in care of Glenn Nichols, Dept. "C" at the address below.

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Supervises a staff of Analysts and Programmers in the design and implementation of MIS. Requires two years of experience as an EDP Systems Project Manager with administrative and supervisory experience desirable. **Starting salary:** $25,326 - $28,621 annually depending on experience.

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Requires two years of programming experience, primarily COBOL, CICS, Database and IBM operating system experience desired, but not necessary. **Starting salary:** $18,035 - $20,111 annually depending upon experience.

Due to the nature of the application systems, a background investigation will be required of the successful applicants.

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Affirmative Action Officer
Search Committee (CIS)
State University of New York
College at Old Westbury
Old Westbury, New York 11568

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Affirmative Action Employer

JOB OPENING

Electrical Engineer needed to design, develop, and implement software tools for the automated design of digital systems. B.S. in Electrical Engineering required. 40 hours per week, $21,000 per year. **Contact Ms. Valeria K. Smith, President, V-R Information Systems, Inc., 5706 Balcones, Suite 203, Austin, Texas. (512) 458-8131.**
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COBOL experience required in the analysis and programming of application systems in higher education.

Exciting things are happening at the University and in the Florida sunshine (no State or local income tax). Join an organization of growth and camaraderie which is dedicated to state of the art systems. Full range of benefits including tuition waiver through Master's level courses and corresponding 75% discount for dependents.

To be considered, send resume and earnings history to:

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Data Processing

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American Television & Communications Corporation is a rapidly expanding multiple system cable television operator, serving over 1 million subscribers nationwide. To meet the challenges of our current and future growth, we are developing on-line computer systems for financial, business accounting and administrative applications.

We currently have a career opportunity available for an individual with 4 years programming and 1-3 years project management experience in a real-time environment to coordinate the development of our subscriber billing system. IBM and CICS experience will be helpful. The selected individual will be responsible for hiring and supervising a staff of 4 to 5 programmer analysts and will be required to travel heavily until January 1981.

ATC offers a competitive salary and benefits package as well as an excellent environment for rapid career advancement. For confidential consideration, please forward salary history and resume to Mr. Chip Crawford, Employment Manager. (No phone calls please.)

ATC

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160 INVERNESS DRIVE WEST
ENGLEWOOD, COLORADO 80112
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ALC + APL

Are you tired of those same old decrepit batch systems?

Are you looking forward to the days of pure interactivity and on line applications?

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Do you want an opportunity to be a pioneer in state-of-the-art computer systems?

We're looking for the kind of person who is.

OUR ENVIRONMENT: IBM VM/370 running only VS/APL.

If you're one, you'll enjoy excellent advancement opportunities, competitive salary and excellent benefits, because you'll be with Ivy Financial Corporation, the umbrella company for several of the largest and fastest growing rare coin and collectible firms in the nation.

Call Chuck Chadwick toll-free at (800) 527-9250. (In Texas call (214) 742-1079.) Or send resume in complete confidence to: 2121 N. Akard, Dallas, Texas 75201. Relocation and interview expenses paid.

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2121 North Akard, Dallas, Texas 75201. (214) 742-1079
WATS: 1 (800) 527-9250. Telex: 732587 IVY FIN CP

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Our client has an excellent career opportunity available to an experienced Professional to work as a Project Leader in the design of high speed Real Time Operating Systems for Telemetry applications. Duties will include structured programming using HOL (PASCAL, PLI, ADA) desired with UNIX or VAX VMS experience ideal. The selected candidate must understand CPU Architecture and HW/SW Trade Off options and possess BS/MS EE/CS.

Salary and benefit programs are structured to enhance your lifestyle in beautiful Florida. Please submit your resume, including salary history, in confidence or call:

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frank leonard personnel
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Tampa, Florida 33607

Our Client Is An Equal Opportunity Employer with Client Company Paying All Fees

Programmers

San Francisco Bay Area

Airco Temescal, a division of Airco Inc., is a leading supplier of vacuum deposition equipment and custom design electron beam evaporation and sputtering systems to the electronics, optical, metal and glass industries. Because of continued growth in operations, the following opportunities are now available in our Data Processing Department:

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Unusual challenge for a Sr. Analyst with 5-7 yrs. designing and programming experience. Manufacturing systems exposure, applications software package analysis and project leadership required. Major duties will include enhancements to the existing system and the implementation of a new on-line manufacturing system.

Programmer Analyst

Opportunity for Programmer with 6 mos.-3 years of systems and programming experience in COBOL environment. Familiarity with GCOS operating system, GCOS JCL and the Honeywell 64/20 preferred. Background in manufacturing systems desired. Position will involve maintenance and enhancement of existing systems.

Salary commensurate with experience plus excellent fringe benefits including FULLY PAID RELOCATION. Please submit resume including salary history, in confidence to Donna MacDonald, Airco Temescal, 2850 7th Street, Berkely, CA 94710. (415) 841-5720. Equal opportunity employer.

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This is a headquarters position with a major telecommunications company involving Hardware and Software Systems focusing on the terminal and customer applications.

Major role in planning and training in conjunction with operating companies across the country.

Requires a BS Engineering or equivalent; plus 5 years commercial SW applications preferably related to teleprocesses.

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Broward County, Florida, one of the largest major employers in south Florida has immediate challenging opportunities in its Information Systems Division utilizing OS/VSI, NCP, VTAM, CICS and IMS/DB methods. Applications are currently being accepted for the following job classes:

Systems Programmer II **$22,128-$29,033**
Requires college degree in computer sciences or related field and four (4) years experience in Systems Analysis, SYSGEN and Maintenance.

Systems Programmer I **$18,616-$24,424**
Requires college degree in computer science or related field and two (2) years experience in Systems Analysis, SYSGEN and Maintenance.

Programmer Analyst II **$21,062-$27,634**
Requires completion of two (2) years of college level course work in computer science and four (4) years computer programming and systems analysis experience.

Programmer Analyst I **$17,719-$23,248**
Requires high school diploma supplemented by college level course work in computer science and two (2) years computer programming and systems analysis experience.

Applications and additional information may be obtained from the

PERSONNEL DIVISION, BROWARD COUNTY
GOVERNOR'S CLUB BUILDING, 2ND FLOOR
236 S.E. FIRST AVE.
FT. LAUDERDALE, FL 33301
Hours: 8:30-5. Phone: 1 (305) 765-5555
Equal Opportunity Employer

APPLICATIONS
PROGRAMMER ANALYST
$1897 to $2311/month
SENIOR PROGRAMMER ANALYST
$2094 to $2551/month

An Applications Programmer Analyst works with users of data processing services to design and maintain information processing systems. A Senior Programmer Analyst supervises a team of Applications Programmers and Analysts in all activities related to systems design, development and maintenance.

Must be experienced, journey-level Applications Programmer to apply. Applicants for Senior Programmer Analyst must have supervision or project-leader experience and performed the duties of an Applications Programmer Analyst.

Must submit SMUD application forms by Thursday, November 6, 1980. Obtain applications:

SMUD

SACRAMENTO MUNICIPAL
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6201 S Street
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Are you tired of that long drive to work everyday? Would you like to live at the edge of the beautiful Sangre de Cristo mountains of northern New Mexico?

If this appeals to you, consider this position. The major responsibilities are to direct the activities of a staff of systems and application programmers in the design and implementation of administrative on-line data base systems and system software; to help maintain the existing administrative batch processing systems and participate in the policy making and allocation of computer resources of the center. Installed system is a Magnuson M80. Qualifications include a Bachelor's degree, work experience in COBOL and BAL, programming management and expertise with interactive hardware and software, preferably WESTI and DATACOM/DB.

For full consideration send resume and salary history, prior to November 10, 1980 to Personnel Office, New Mexico Highlands University, Las Vegas, New Mexico 87701. NMHU is an EOE/AFFIRMATIVE Action Employer.

Systems Development Professional

Private 2 year college in Baltimore County, Maryland is seeking an individual with a systems analysis background to perform the initial development of a proposed college-wide Management Information System. The applicant should possess a Bachelor's Degree in a related discipline and demonstrate 4 years of experience in systems design including development of hardware and software specifications, procurement and related duties. This position will be a "ground floor" opportunity for a person to progress to Manager of Data Processing as the system is implemented. Salary is commensurate with experience and may be arranged on a 12 or 10 month basis. Applicants should send their resumes to **President's Office, Villa Julie College, Stevenson, MD 21153.**

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Clayton County Civil Service System, Jonesboro, Georgia, located just south of Atlanta, is currently seeking a qualified, experienced person to manage a well established governmental Data Processing Center. Candidate must have extensive experience with S/3 13D Computer, with CCP, and ability to plan, organize, supervise and instruct subordinates in the methods of Computer Programming and Operations; to establish, develop and maintain effective working relationship with officials, subordinates, business representatives and the general public. Excellent salary and fringe benefits. Interested candidates should submit complete resume and salary history to: **A.C. Collier, Personnel Director, Clayton County Civil Service System, County Administration Building, Jonesboro, Georgia 30236. (404) 478-9911 Ext. 328.**

CLOSING DATE: NOVEMBER 23, 1980
EQUAL OPPORTUNITY EMPLOYER

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Data Processing Manager

(San Francisco Peninsula)

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Rebecca Adams Nestor
Employment Manager
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San Jose, CA 95108

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Racal-Milgo, world leader in data communications, has an outstanding marketing opportunity available. Our tremendous growth and expansion has created an opening for a Multiplexer Marketing Manager to be responsible for all marketing and future product planning activities relating to Racal-Milgo's new Advanced Statistical Multiplexer product line.

This position involves planning future product requirements, analyzing market conditions and competitive activity, establishing marketing plans, coordinating activities with various departments and providing overall product line leadership.

The candidate should have a B.S. in Engineering/Computer Sciences or Marketing (or equivalent) and at least twelve years experience in data communications, with a strong background in multiplexer products.

Racal-Milgo offers an excellent salary, bonus, and benefits plus the opportunity to expand your professional career development with a major international company. If you meet the above qualifications and would like to take an active role in our worldwide marketing operations, call **Linda Huett** in our Corporate Headquarters collect at 305/591-5907.

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SYSTEMS MARKETING MANAGERS

You're a results-oriented problem-solver with ambitious career objectives. Your background includes a degree with at least 5 years successful data processing experience in systems software/hardware or planning. And your ability to communicate both orally and in writing is excellent. If so, you're qualified for these management positions in our Dallas office.

We're HDR Systems, a nationally recognized consulting firm and widely respected leader in computer services. The dynamic, articulate professionals we select will prepare and present original proposals, interact closely with clients as well as orgânize and conduct the marketing program for our systems consulting services.

In addition to high visibility and further growth potential, we offer an attractive starting salary commensurate with expertise, and comprehensive benefits. For immediate consideration, please call TOLL FREE 800-228-2760, or send your detailed resume in confidence to: JACQUE EVANS

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Headquarters for a multi-state corporation is seeking a professional manager to direct expanding scope of data processing functions. The person in this position will direct all data processing activities for the company.

Responsibility includes supervision of computer, operations, data communications, systems analysis, programming and support functions, feasibility studies, planning for short and long-range systems design and development.

Successful candidate will have a strong commercial management and technical background. Other key attributes for this position include a degree in business and recent experience in distributed on-line processing, formalized departmental reporting and control, and knowledgeable about data security.

Information submitted for consideration must be complete and contain salary history. Write: **CW Box 2410, 375 Cochituate Rd., Rte. 30, Framingham, Mass. 01701.**

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1 - Manufacturing Engineer M.E.
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1 - Computer Senior Programmer Analyst

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Experience - Three or more years experience.
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International multi-company transportation group headquartered in Great Falls, Montana, has a need for an innovative, responsible EDP professional with a preferred background in trucking industry systems. He must be heavily qualified in Burroughs equipment, data communications, NDL, MCS, data base (DMSII) design and implementation, COBOL, RPGII, and state of the art hardware. He must be capable of giving direction to Programmer Analyst and communicate effectively with data processing and users. Salary open. **Send resume, including salary history to: George Conqueel, Transystems, Inc., P.O. Box 399, Black Eagle, Montana 59414.**

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Qualifications include: Bachelor's Degree or equivalent experience plus 2 years experience with a medium scale computing system and at least one year of supervisory experience. Duties will include supervision of programming staff of seven, coordination of computing systems and planning. Salary is open and will be based on education, training and experience. Application deadline Dec. 1. A completed application includes a resume, transcripts and recommendations. Mail to:

Lyle Hunter, Computer Center, University of Wisconsin-Whitewater, Whitewater, WI 53190.

UW-Whitewater is an equal opportunity employer with an affirmative action plan. Females, minorities and handicapped are encouraged to apply.

CPA SERVICE BUREAU MANAGER - SYS34 RELOCATE REDDING, CA

Outstanding career opportunity. Minimum 3 years experience in batch and interactive RPGII programming. Background in management, Sys 34 telecom, and accounting is a plus. Aid in establishment and implementation of effective business systems. $25,000 to $30,000. Must show a winning track record. **Send resume to NV DATA CORP., P.O. Box 3609, Redding, CA 96049.**

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Equal Opportunity Employer M/F

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Ad closing is every Friday, 10 days prior to issue date.

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Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld.
Box Numbers are available. $10 per insertion.
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To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

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New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181
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William J. Mills, Manager Classified Advertising

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Programmer/Analysts

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Manufacturing Systems Analyst

You will perform systems analysis, on-line systems design, implementation and documentation in support of manufacturing systems. Your experience must include programming as well as manufacturing systems design. Previous experience utilizing PL/1, CICS, DOS and DL/1 would be helpful.

Programmers

You will analyze programs specifications, prepare detailed program design, code, debug and test programs, and prepare related systems and user documentation. You should have 1-3 years programming in COBOL or PL/1, operating system experience (DOS/VS or DOS/VSE), and a related degree. Data base (DL/1), on-line CICS command level, CAPOSS, CORMES, COPICS and manufacturing systems experience is desired.

You'll enjoy the working environment at our beautiful new building on the Willamette River. If you're interested in working in the heart of the electronics industry without the industry pressure, please send your resume to Mary C. Walhood, Wacker Siltronic, Dept. 4GH-1, P.O. Box 03180, Portland, Oregon 97201, or call 503/243-2020. An equal opportunity employer.

WACKER SILTRONIC CORPORATION

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Key positions are available for:

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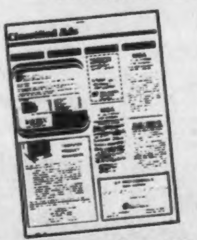

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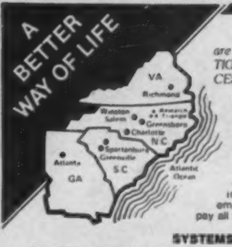

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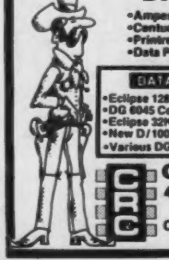

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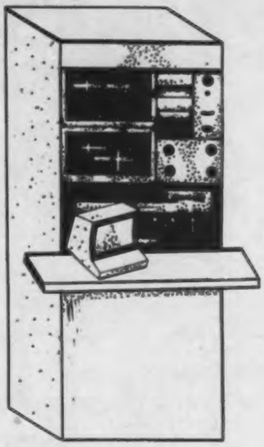

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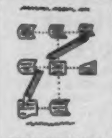
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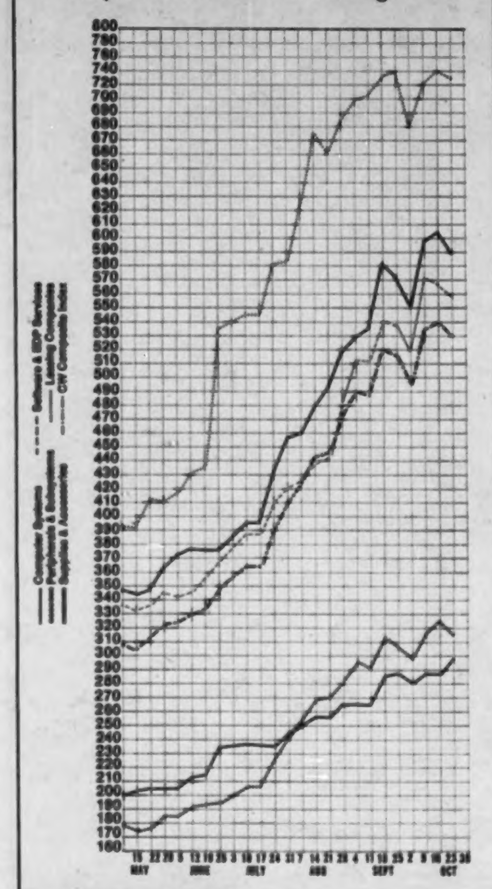

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 22, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	30 3/4	-2 5/8	-7.8
N	BURROUGHS CORP	55- 88	55	-4 1/8	-6.9
O	COMPUTER AUTOMATION	9- 27	22 1/4	0	0.0
N	CONTROL DATA CORP	35- 77	71 3/4	-4	-5.2
O	CRAY RESEARCH INC	30- 99	90 3/4	-3 3/4	-3.9
N	DATA GENERAL CORP	46- 87	72 1/4	-8	-9.9
N	DATAPOINT CORP	44- 97	91	-4 3/4	-4.9
N	DIGITAL EQUIPMENT	52- 96	90	-5 1/4	-5.5
A	EECO INC	9- 21	20 7/8	- 1/8	-0.5
N	ELECTRONIC ASSOC.	6- 12	10 3/8	+ 3/8	+3.7
N	FOUR-PHASE SYSTEMS	20- 49	29	-2	-6.4
N	FOXBORO	31- 57	56 3/4	+4 1/4	+8.0
O	GENERAL AUTOMATION	7- 19	10 1/8	+ 1/2	+5.1
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 92	78 1/4	-3 1/4	-3.9
N	HONEYWELL INC	65-101	91 5/8	- 1/8	-0.1
N	IBM	50- 79	67 3/4	-2 5/8	-3.7
O	MAGNUSON COMP SYSTS	20- 37	35 1/2	- 1/2	-1.3
N	MANAGEMENT ASSIST	9- 25	23 7/8	-1	-4.0
O	MANUFACTURING DATA S	22- 69	68 1/2	+3 3/4	+5.7
O	MINI-COMPUTER SYST	2- 6	3 1/8	- 1/4	-7.4
O	MODULAR COMPUTER SYS	9- 31	27 1/4	-2 1/2	-8.4
N	NCR	52- 82	70 1/4	-3 3/4	-5.0
N	PRIME COMPUTER INC	15- 49	44 1/4	-2 5/8	-5.5
N	PERKIN-ELMER	26- 68	65 7/8	-2 1/2	-3.6
N	SPERRY RAND	42- 60	51	-1 3/8	-2.6
A	SYSTEMS ENG. LABS	11- 45	41	-2 3/4	-6.2
O	TANDEM COMPUTERS INC	13- 68	63 1/2	-4 1/4	-6.2
N	TEXAS INSTRUMENTS	79-144	135 5/8	-2 3/4	-1.9
A	WANG LABS.	17- 60	57 1/2	- 1/4	-0.4

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOTHE FINANCIAL CP	13- 27	24 3/4	-1 3/4	-6.6
N	COMDISCO INC	6- 18	17 3/8	- 5/8	-3.4
A	COMMERCE GROUP CORP	1- 2	1	- 1/8	-11.1
A	COMPUTER INVSTRS GRP	2- 4	1 3/4	- 1/8	-6.6
O	CONTINENTAL INFO SYS	2- 15	5 1/2	- 1/2	-8.3
N	DATRONIC RENTAL	2- 5	4 1/8	0	0.0
A	DCL INC	3- 6	3 1/8	0	0.0
N	DPF INC	5- 12	7 1/2	-1 1/4	-14.2
N	ITEL	1- 15	1 3/8	- 5/8	-31.2
O	LEASPAC CORP	1- 2	1	+ 3/8	+60.0
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	24- 70	69 5/8	-3 1/4	-4.4
N	U.S. LEASING	12- 24	23 3/8	+1 3/8	+6.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
C=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	4 1/2	- 3/4	-14.2
O	ANACOMP INC	7- 21	20 3/4	+1 1/2	+7.7
O	ANALYSTS INTL CORP	3- 10	9 3/4	+ 3/4	+8.3
A	APPLIED DATA RES.	6- 24	21 7/8	- 7/8	-3.8
N	AUTOMATIC DATA PROC	31- 52	49	+1	+2.0
O	COMPUTER HORIZONS	1- 9	6	- 3/4	-11.1
O	COMPUTER NETWORK	4- 9	6 1/2	- 1/4	-3.7
N	COMPUTER SCIENCES	11- 30	20 1/8	- 1/2	-2.4
O	COMPUTER TASK GROUP	1- 20	21 1/2	+1 1/2	+7.5
O	COMPUTER USAGE	2- 10	8 1/4	- 1/2	-5.7
O	COMPUT AUTO REP SVC	4- 10	9 1/8	0	0.0
O	COMSHARE	11- 21	18 3/4	- 3/4	-3.8
O	CULLINANE CORP	18- 65	59	-5 3/4	-8.8
O	DATA DIMENSIONS INC	1- 6	1 3/4	- 1/8	-6.6
O	DATATAB	1- 4	1 1/4	+ 1/4	+25.0
O	DSI CORP	4- 9	8	0	0.0
N	ELECTRONIC DATA SYST	19- 37	32	-1	-3.0
O	INFORMATICS INC	9- 25	20 3/4	-1 7/8	-8.2
O	INSVIE CORP	1- 3	2 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 4	2 1/2	- 1/2	-16.6
O	KEANE ASSOCIATES	3- 9	6 1/4	+ 3/4	+13.6
O	KEYDATA CORP	2- 5	1 5/8	- 1/8	-7.1
A	LOGICON	12- 28	27 1/2	+1 1/4	+4.7
O	MATHEMATICA INC	5- 18	14 1/4	-1 1/4	-8.0
O	MATHEMATICAL APP GRP	7- 33	28	-1 1/2	-5.0
O	NATIONAL DATA CORP	10- 29	27	- 1/2	-1.8
N	PLANNING RESEARCH	5- 13	12 5/8	+ 1/4	+2.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	7 1/4	- 3/4	-9.3
O	REYNOLDS & REYNOLD	21- 36	23	-1 1/2	-6.1
O	STSC INC	6- 19	17 1/2	- 1/4	-1.4
O	SCIENTIFIC COMPUTERS	6- 27	26 1/2	+1 1/4	+4.9
N	TYMSHARE INC	34- 79	78 3/4	+ 1/2	+0.6
A	URS SYSTEMS	5- 15	15 1/4	+ 1/2	+3.3
N	WYLY CORP	4- 20	17 3/8	-1 1/8	-6.0

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 26	15	- 1/8	-0.8
N	AMPEX CORP	14- 34	32 3/8	-1 1/4	-3.7
A	ANDERSON JACOBSON	9- 18	15 3/8	-1 1/8	-6.8
N	APPLIED DIG DATA SYS	5- 12	11 7/8	0	0.0
O	AUTO-TROL TECHNOLOGY	18- 62	49	-5	-9.2
O	BEEHIVE INT'L	3- 18	17 1/4	- 1/2	-2.8
A	BOLT-BERANEK & NEW	12- 35	33 5/8	-1 3/8	-3.9
N	BUNKER-RAMO	17- 41	37 1/2	- 1/2	-1.3
O	CAMBRIDGE MEMORIES	1- 9	3 7/8	0	0.0
N	CENTRONICS DATA COMP	20- 55	31 1/8	+1 5/8	+5.5
A	CETEC CORP	3- 7	7	- 1/4	-3.4
O	COMPUTER DEVICES INC	5- 10	7 7/8	- 1/2	-5.9
O	COGNITRONICS	1- 8	7 1/2	+ 5/8	+9.0
O	COMPUTER COMMUN.	4- 10	7 1/4	- 3/4	-9.3
O	COMPUTER CONSOLES	4- 29	21 5/8	-2 7/8	-11.7
O	COMPUTER TRANSCEIVER	1- 5	3 3/4	+ 1/4	+7.1
N	COMPUTERVISION CORP	24- 92	64 7/8	-2 1/8	-3.1
N	CONRAC CORP	13- 25	17 1/2	- 1/2	-2.7
A	DATA ACCESS SYSTEMS	6- 17	15 1/2	- 7/8	-5.3
A	DATA PRODUCTS CORP	11- 35	30 7/8	-2 3/4	-8.1
O	DATUM INC	2- 5	4	-1	-20.0
O	DECISION DATA COMPUT	2- 6	5	0	0.0
O	DELTA DATA SYSTEMS	1- 3	2	- 1/2	-20.0
N	DOCUMATION INC	7- 27	16 5/8	+ 1/8	+0.7
O	DATARAM CORP	6- 37	10 1/8	- 5/8	-5.8
N	ELECTRONIC M & M	3- 8	7 1/2	- 1/8	-1.6
O	EVANS & SUTHERLAND	21- 72	69 1/2	+ 1/2	+0.7
O	FABRI-TEK	1- 4	3 1/8	0	0.0
O	GENERAL COMPUTER SYS	1- 6	4 7/8	- 1/2	-9.3
O	GENERAL DATACOMM IND	12- 30	27 1/4	-1 3/4	-6.0
O	GENERAL TERMINAL CP	1- 4	1 5/8	+	+3.9
N	HAZELTINE CORP	12- 33	29 1/2	-1 1/2	-4.8
N	HARRIS CORP	25- 52	52 1/4	+1 1/4	+2.4
O	INFORMATION INTL INC	8- 15	13 1/4	- 3/4	-5.3
O	INTEL CORP	23- 50	48	-1 1/4	-2.5
O	INTERSIL	13- 33	33	+ 1/8	+0.3
A	LUNDY ELECTRONICS	4- 17	15 3/4	-1	-5.9
O	MSI DATA CORP	5- 16	14 3/4	+ 3/8	+2.6
N	MEMOREX	10- 34	16	+1 1/2	+10.3
N	MOHAWK DATA SCI	10- 31	29 1/2	-1	-3.2
O	OMEX	2- 12	12 1/2	+ 1/2	+4.1
A	PARADYNE CORP	18- 52	51 7/8	+ 7/8	+1.7
A	PENRIL CORP	9- 15	13 1/2	+ 7/8	+6.9
O	RAMTEK CORP	10- 18	16 3/4	-1	-5.6
O	RECOGNITION-EQUIP	5- 21	19 3/8	-1 1/8	-5.4
O	SCAN DATA	1- 5	2 3/8	0	0.0
N	STORAGE TECHNOLOGY	12- 26	22 3/4	-1 1/8	-4.7
O	SYKES DATATRONICS	14- 47	45	+2 1/2	+5.8
O	T BAR INC	14- 22	20 3/4	-1	-4.5
A	TEC INC	3- 9	5 3/4	- 1/2	-8.0
N	TEKTRONIX INC	42- 70	62 7/8	-3 7/8	-5.8
N	TELEX	3- 6	6 1/8	0	0.0
O	TESDATA SYSTEMS CP	8- 26	15 1/4	- 3/4	-4.6
A	TIMEPLEX INC	7- 29	23 5/8	-2 3/8	-9.1
O	WILTEK INC	1- 3	2 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 15	13 3/4	0	0.0
O	BALTIMORE BUS FORMS	1- 2	1	+ 1/4	+33.3
N	BARRY WRIGHT	8- 22	18 3/4	-2	-9.6
O	CYBERMATICS INC	1- 2	1 1/2	+ 1/4	+20.0
A	DUPLEX PRODUCTS INC	11- 16	14 1/4	+ 1/8	+0.8
N	ENNIS BUS. FORMS	13- 21	17 3/4	- 3/8	-2.0
N	3M COMPANY	46- 63	56 5/8	- 3/8	-0.6
O	MOORE CORP LTD	27- 37	34	- 1/8	-0.3
N	NASHUA CORP	20- 35	28 7/8	+1 3/8	+5.0
O	STANDARD REGISTER	22- 35	33	+2 1/2	+8.1
A	TAB PRODUCTS CO	13- 34	24 3/8	-9 3/8	-27.7
N	WABASH MAGNETICS	11- 20	19 3/4	+3 1/8	+18.7
N	WALLACE BUS FORMS	23- 47	46 1/2	+1 1/4	+2.7

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